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CURIOSITIES OF CIVILIZATION

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"QUARTERLY" & "EDINBURGH" REVIEWS.

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BY

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TO THE READER.

THE following Essays have been reprinted from the pages of the *Quarterly* and *Edinburgh Reviews*, with the kind permission of their proprietors. It may be necessary, however, to state that, with the exception of the paper on the "Mortality in Trades and Professions," which was published in the *Edinburgh Review* of January, 1860, the whole of them have appeared in the *Quarterly Review* during the last six years. The date of each essay is given in the list of contents; but, where necessary, corrections have been made, so as to bring each article up to the knowledge of the present day.

A. W.

COLEHERNE COURT, OLD BROMPTON,
August, 1860.

CONTENTS.

		PAGE.
ADVERTISEMENTS	(1855)	1
FOOD AND ITS ADULTERATIONS	(1855)	53
THE ZOOLOGICAL GARDENS	(1855)	93
RATS	(1857)	128
LUNATIC ASYLUMS	(1857)	150
THE LONDON COMMISSARIAT	(1854)	200
WOOLWICH ARSENAL	(1858)	245
SHIPWRECKS	(1858)	288
LODGING, FOOD, AND DRESS OF SOLDIERS	(1859)	325
THE ELECTRIC TELEGRAPH	(1854)	349
FIRES AND FIRE INSURANCE	(1855)	401
THE POLICE AND THE THIEVES	(1856)	451
MORTALITY IN TRADES AND PROFESSIONS	(1860)	499

ADVERTISEMENTS.

It is our purpose to draw out, as a thread might be drawn from some woven fabric, a continuous line of advertisements from the newspaper press of this country, since its establishment to the present time; and, by so doing, to show how distinctly, from its dye, the pattern of the age through which it ran is represented. If we follow up to its source any public institution, fashion, or amusement, which has flourished during a long period of time, we can gain some idea of our national progress and development; but it strikes us that in no manner can we so well obtain at a rapid glance a view of the salient points of generations that have passed, as by consulting those small voices that have cried from age to age from the pages of the press, declaring the wants, the losses, the amusements, and the money-making eagerness of the people.

As we read in the old musty files of papers those *naïve* announcements, the very hum of bygone generations seems to rise to the ear. The chapman exhibits his quaint wares; the mountebank capers again upon his stage; we have the living portrait of the highwayman flying from justice; we see the old china auctions thronged with ladies of quality with their attendant negro boys, or those "by inch of candlelight" forming many a Schalken-like picture of light and shade; or, later still, we have Hogarthian sketches of the young bloods who swelled of old along the Pall-Mall. We trace the moving panorama of men and manners up to our own less demonstrative but more

earnest times; and all these cabinet pictures are the very daguerreotypes cast by the age which they exhibit, not done for effect, but faithful reflections of those insignificant items of life and things, too small, it would seem, for the generalizing eye of the historian, however necessary to clothe and fill in the dry bones of his history.

The *English Mercurie* of 1588, which professes to have been published during those momentous days when the Spanish Armada was hovering and waiting to pounce upon our southern shores, contains, among its items of news, three or four book advertisements, and these would undoubtedly have been the first put forth in England were that newspaper genuine. Mr. Watts, of the British Museum, has, however, proved that the several numbers of this journal to be found in our national library are gross forgeries, and, indeed, the most inexperienced eye in such matters can easily see that neither their type, paper, spelling, nor composition are much more than one, instead of upwards of two centuries and a half old. Newspapers, in the strict sense of the word—that is, publications of news appearing at stated intervals, and regularly paged on—did not make their appearance until the latter end of the reign of James I. The *Weekely Newes*, published in London in 1622, was the first publication which answered to this description; it contained, however, only a few scraps of foreign intelligence, and was quite destitute of advertisements. The terrible contest of the succeeding reign was the hotbed which forced the press of this country into sudden life and extraordinary vigour. Those who have wandered in the vaults of the British Museum and contemplated the vast collection of political pamphlets and the countless Mercuries which sprang full armed, on either side of the quarrel, from the strong and earnest brains which wrought in that great political trouble, will not hesitate to discover, amidst the hubbub of the Rebellion, the first throes of the press of England as a political power. At such a time, when Marchmont Needham fell foul with his types of Sir John Birkenhead and the court party which he supported, with as heavy a hand and as dauntless a will as Cromwell hurled his Ironsides at the

Cavaliers at Naseby, it is not likely that we should find the press the vehicle to make known the goods of tradesmen, or to offer a reward for stolen horses. The shopkeepers themselves, as well as the nobility, were too hard at it, to avail themselves of this new mode of extending their trade: they had to keep guard over the malignants, to cover the five members with the shield of their arms, to overawe Whitehall, to march to the relief of Gloucester,—objects quite sufficient to account for the fact that the train-bands were not advertisers. After the king's death, however, when the Commonwealth had time to breathe, the people seem to have discovered the use of the press as a means of making known their wants and of giving publicity to their wares. The very first advertisement we have met with, after an active search among the earliest newspapers, relates to a book which is entitled—

IRENODIA GRATULATORIA, an Heroick Poem; being a congratulatory panegyrick for my Lord General's late return, summing up his successes in an exquisite manner.
To be sold by John Holden, in the New Exchange, London. Printed by Tho. Newcourt, 1652.

This appeared in the January number of the Parliamentary paper *Mercurius Politicus*. It is evidently a piece of flattery to Cromwell upon his victories in Ireland, and might have been inserted at the instigation of the great Commonwealth leader himself. Booksellers appear to have been the first to take advantage of this new medium of publicity, and for the obvious reason that their goods were calculated for the readers of the public journals, who at that time must have consisted almost exclusively of the higher orders. From this date to the Restoration the quaintest titles of works on the political and religious views, such as were then in the ascendant, are to be found in the *Mercurius Politicus*: thus, we have "Gospel Marrow;" "A few Sighs from Hell, or the Groans of a Damned Soul;" "Michael opposing the Dragon, or a Fiery Dart struck through the Kingdom of the Serpent." And in the number for September, 1659, we find an advertisement which seems to bring us face to face with one of the brightest names in the roll of English poets:—

CONSIDERATIONS touching the likeliest means to remove Hirelings out of the Church; wherein is also discours'd of Tithes, Church Fees, Church Revenues, and whether any maintenance of Ministers can be settled by Law. The author, J. M. Sold by *Livewell Chapman*, at the Crown in Pope's Head Alley.

In juxtaposition to these illustrious initials we find another advertisement, which is the representative of a class that prevailed most extensively at this early time—the Hue and Cry after runaway servants and lost or stolen horses and dogs. Every generation is apt to praise, like Orlando, "the antique service of the old world;" but a little excursion into the regions of the past shows us how persistent this cry has been in all ages. Employers who are in the habit of eulogising servants of the "old school," would be exceedingly astonished to find that two hundred years ago they were a very bad lot indeed, as far as we can judge from the advertisements of rewards for the seizure of delinquents of their class. Here is a full-length portrait of apparently a runaway apprentice, as drawn in the *Mercurius Politicus* of July 1st, 1658:—

IF any one can give notice of one *Edward Perry*, being about the age of eighteen or nineteen years, of low stature, black hair, full of pockholes in his face; he weareth a new gray suit trimmed with green and other ribbons, a light Cinnamon-colored cloak, and black hat, who run away lately from his Master; they are desired to bring or send word to *Tho. Firby*, Stationer, at Gray's Inne gate, who will thankfully reward them.

It will be observed that the dashing appearance of this runaway apprentice, habited in his gray suit trimmed with green ribbons, and furbished off so spicily with his cinnamon-coloured cloak, is rather marred by the description of his face as "full of pockholes." Unless the reader has scanned the long list of villanous portraits exhibited by the Hue and Cry in the old papers of the last portion of the seventeenth and first portion of the eighteenth centuries, he can form but a faint conception of the ravages committed by the small-pox upon the population. Every man seemed more or less to have been speckled with "pockholes," and the race must have presented one moving mass of pits and scars. Here, for instance, is a

companion picture to hang with that of Edward Perry, copied from the *Mercurius Politicus* of May 31st, 1660 :—

A Black-haired Maid, of a middle stature, thick set, with big breasts, having her face full marked with the smallpox, calling herself by the name of *Nan* or *Agnes Hobson*, did, upon Monday the 28 of *May*, about six o'Clock in the morning, steal away from her Ladies house in the Pal-mall a mingle-coloured wrought Tabby Gown of Deer colour and white ; a black striped Sattin Gown with four broad bone-black silk Laces, and a plain black-watered French Tabby Gown ; Also, one Scarlet-coloured and one other Pink-coloured Sarcenet Peticoat, and a white watered Tabby Wastcoat, plain ; Several Sarcenet, Mode, and thin black Hoods and Scarfs, several fine Holland Shirts, a laced pair of Cuffs and Dressing ; one pair of Pink-coloured Worsted Stockings, a Silver Spoon, a Leather bag, &c. She went away in greyish Cloth Wastcoat turned, and a Pink-coloured Paragon upper Peticoat, with a green Tammy under one. If any shall give notice of this person, or things, at one *Hopkins*, a Shoomaker's, next door to the Vine Tavern, near the Pal-mall end, near Charing Cross, or at Mr. *Ostler's*, at the Bull Head in Cornhill, near the Old Exchange, they shall be rewarded for their pains.

Scarcely a week passes without such runaways being advertised, together with a list of the quaint articles of which their booty consisted. At the risk of wearying the reader with these descriptions of the "old-fashioned" sort of servants, we give another advertisement from the *Mercurius Politicus* of July 1st 1658 :—

ONE *Eleanor Parker* (by birth *Haddock*), of a Tawny reddish complexion, a pretty long nose, tall of stature, servant to Mr. *Frederic Howpert*, Kentish Town, upon Saturday last the 26*th of June*, ran away and stole two Silver Spoons ; a sweet Tent-work Bag, with gold and silver Lace about it, and lined with Satin ; a Bugle work-Cushion, very curiously wrought in all manners of slips and flowers ; a Shell cup, with a Lyon's face, and a Ring of silver in its mouth ; besides many other things of considerable value, which she took out of her Mistresses Cabinet, which she broke open ; as also some Cloaths and Linen of all sorts, to the value of Ten pounds and upwards. If any one do meet with her and please to secure her, and give notice to the said *Frederic Howpert*, or else to Mr. *Malpass*, Leather-seller, at the Green Dragon, at the upper end of Lawrence Lane, he shall be thankfully rewarded for his pains.

An advertisement which appears in the same paper, of the date of August 11th, 1659, gives us the first notice we have yet found of the service of negro boys in this country. From this period, however, as we shall presently show, England, at least the fashionable part of it, seems to have swarmed with young blackamoors in a greater degree than we should have

imagined even from the familiar notice made of them in the pages of the "Tatler" and "Spectator." These early negroes must have been imported from the Portuguese territories, as we did not deal in the article ourselves till the year 1680. The amusing point of the following advertisement, however, is the assurance it gives us that the Puritans "polled" their negroes as well as themselves.

A Negro-boy, about [redacted] years of age, in a gray Searge suit, his hair cut close to his head, was lost on Tuesday last, *August* 9, at night, in *S. Nicholas* Lane, *London*. If any one can give notice of him to Mr. *Tho. Barker*, at the Sugarloaf in that Lane, they shall be well rewarded for their pains.

About this time we find repeatedly advertised the loss of horses. It is observable that during the "troubles" such things as highwaymen were unknown. The bold, unruly characters, who at a later date took to the road, were then either enlisted under the banners of the state or had gone over the sea to Charlie. The great extent to which horse-stealing prevailed during the Commonwealth period, and, indeed, for the next half-century, might possibly be ascribed to the value of those animals consequent upon the scarcity produced by the casualties of the battle-field. We cannot account, however, for one fact connected with the horse-stealing of the Commonwealth period, namely, that when at grass they were often kept *saddled*. The following advertisement, which is an illustration of this singular custom, is very far from being an uncommon one :—

A Small Black NAG, some ten or eleven years old, no white at all, bob-Tailed, wel forehanded, somewhat thin behind, thick Heels, and goeth crickling and lamish behind at his first going out; the hair is beat off upon his far Hip as broad as a twelvepence; he hath a black leather Saddle trimmed with blew, and covered with a black Calves-skin, its a little torn upon the Pummel; two new Girths of white and green thread, and black Bridle, the Rein whereof is sowed on the off side, and a knot to draw it on the near side, Stoln out of a field at *Chelmsford*, 21 *February* instant, from Mr. *Henry Bullen*. Whosoever can bring tidings to the said Mr. *Bullen* at *Bromfield*, or to Mr. *Newman* at the Grocer's Arms in *Cornhil*, shall have 20*s*. for his pains.—*Mercurius Politicus*, February 24, 1659.

It could scarcely have been, in this particular case at least,

that the exigencies of the time required such precautions, as the only rising that took place this year occurred six months afterwards in the county of Chester. The furniture of the nag, it must be confessed, seems remarkably adapted for service, and might, from its colour, have belonged to a veritable Ironside trooper. Another reason, perhaps, of the great value of horses at this period, was the establishment of public conveyances, by which means travellers as well as letters were conveyed from one part of the kingdom to the other. Up to the year 1636 there was no such thing as a postal service for the use of the people in this country. The court had, it is true, an establishment for the forwarding of despatches, but its efficacy may be judged of from a letter written by one Bryan Tuke, "master of the postes" in Henry VIII.'s time, to Cromwell, who had evidently been sharply reproving him for remissness in forwarding the king's papers:—

"The Kinges Grace hath no mor ordinary postes, ne of many days hathe had, but betweene London and Calais . . . . For, sir, ye knowe well that, except the hackney-horses betweene Gravesende and Dovour, there is no suche usual conveyance in post for men in this realme as in the accustomed places of France and other partes; ne men can keepe horses in redynes withoute som w[illegible]o bere the charges; but when placardes be sent for suche cause (to or[illegible] immediate forwarding of some state packet) *the constables may[illegible] fayne to take horses oute of ploues and cartes, wherein can b[illegible] diligence.*"

This was in the year 1533. Elizabeth, however, established horse-posts on all the great routes for the transmission of the letters of the court; and this, in 1633, was developed into a public post, which went night and day at the rate of seven miles an hour in summer and five miles in winter—not such bad travelling for those days. Still there was no means of forwarding passengers until the time of Cromwell, when we find stage-coaches established on all the great roads throughout the kingdom. We do not know that we have ever seen quoted so early a notice of public stage conveyances. We have evidently not given our ancestors so much credit as they deserved. The following advertisement shows the time taken and the fares of a considerable number of these journeys:—

FROM the 26 day of April 1658 there will continue to go Stage Coaches from the *George* Inn, without Aldersgate, *London*, unto the several Cities and Towns, for the Rates and at the times, hereafter mentioned and declared.

Every Monday, Wednesday, and Friday.

To *Salisbury* in two days for xxs. To *Blandford* and *Dorchester* in two days and half for xxxs. To *Burput* in three days for xxxs. To *Exmaster*, *Hunnington*, and *Exeter* in four days for xls.

To *Stamford* in two days for xxs. To *Newark* in two days and a half for xxvs. To *Bawtrey* in three days for xxxs. To *Doncaster* and *Ferribridge* for xxxvs. To *York* four days for xls.

Mondays and *Wednesdays* to *Ockinton* and *Plymouth* for ls.

Every *Monday* to *Helperby* and *Northallerton* for xlvs. To *Darneton* and *Ferryhil* for ls. To *Durham* for lvs. To *Newcastle* for iiil.

Once every fortnight to *Edinburgh* for ivl. a peece—*Mondays*.

Every *Friday* to *Wakefield* in four days, xls.

All persons who desire to travel unto the Cities, Towns, and Roads herein hereafter mentioned and expressed, namely—to *Coventry*, *Litchfield*, *Stone*, *Namptwich*, *Chester*, *Warrington*, *Wiggan*, *Chorley*, *Preston*, *Gastany*, *Lancaster*, and *Kendal;* and also to *Stamford*, *Grantham*, *Newark*, *Tuxford*, *Bawtrey*, *Doncaster*, *Ferriebridge*, *York*, *Helperly*, *Northallerton*, *Darneton*, *Ferryhill*, *Durham*, and *Newcastle*, *Wakefield*, *Leeds*, and *Halifax;* and also to *Salisbury*, *Blandford*, *Dorchester*, *Burput*, *Exmaster*, *Hunnington*, and *Exeter*, *Ockinton*, *Plimouth*, and *Cornwal;* let them repair to the *George* Inn at *Holborn Bridge*, *London*, and thence they shall be in good Coaches with good Horses, upon every *Monday*, *Wednesday*, and *Fridays*, at and for reasonable Rates.—*Mercurius Politicus*, April 1, 1658.

Other announcements about the same time prove that the Great Western road was equally provided, as well as the Dover route to the continent. It is not singular, however, that regularly-appointed coaches, starting at stated intervals, should have preceded what might be considered the simpler arrangement of the horse service. That the development of the postal system into a means of forwarding single travellers did not take place until some time afterwards, would appear from the following :—

The Postmasters on Chester *Road, petitioning, have received Order, and do accordingly publish the following advertisement :—*

ALL Gentlemen, Merchants, and others, who have occasion to travel between *London* and *Westchester*, *Manchester*, and *Warrington*, or any other Town upon that Road, for the accommodation of Trade, dispatch of Business, and ease of Purse, upon every Monday, Wednesday, and Friday Morning, betwixt Six and ten of the Clock, at the House of Mr. *Christopher Charteris*, at the sign of the Hart's-Horn, in West-Smithfield, and Post-Master there, and at the Post-Master of *Chester*, at the

Post-Master of *Manchester*, and at the Post-Master of *Warrington*, may have a good and able single Horse, or more, furnished at Threepence the Mile, without the charge of a Guide; and so likewise at the House of Mr. *Thomas Challenor*, Post-Master at *Stone* in *Staffordshire*, upon every Tuesday, Thursday, and Saturdays Morning, to go for *London*. And so likewise at the several Post-Masters upon the Road, who will have all such set days so many Horses with Furniture in readiness to furnish the Riders without any stay to carry them to or from any the places aforesaid, in Four days, as well to *London* as from thence, and to places nearer in less time, according as their occasions shall require, they ingaging at the first Stage where they take Horse, for the safe delivery of the same to the next immediate Stage, and not to ride that Horse any further without consent of the Post-Master by whom he rides, and so from Stage to Stage to their Journeys end. *All those who intend to ride this way are desired to give a little notice beforehand, if conveniently they can, to the several Post-masters where they first take horse, whereby they may be furnished with so many Horses as the Riders shall require with expedition.* This undertaking began the 28 of *June* 1658 at all the Places abovesaid, and so continues by the several Post-Masters.

The intimation that these horses might be had without the "charge of a guide" gives us an insight into the bad condition of the roads up to that period. We can scarcely imagine, in these days, the necessity for a guide to direct us along the great highways of England, and can with difficulty realize to ourselves the fact that as late as the middle of the seventeenth century the interior of the country was little better than a wilderness, as we may indeed gather from Pepy's journey from London to Bristol and back, in which the item "guides" formed no inconsiderable portion of his expenses.

In turning over the musty little quarto newspapers which mirror with such vividness the characteristic lineaments of the Commonwealth period, not yet left behind us, we chanced upon an advertisement which tells perhaps more than any other of the dangerous complexion of those times. It is an advertisement for some runaway young "sawbones," whose love of desperate adventure appears to have led him to prefer the tossing of a pike to pounding with a pestle :—

George Weale, a Cornish youth, about 18 or 19 years of age, serving as an Apprentice at *Kingston* with one Mr. *Weale*, an Apothecary, and his Uncle, about the time of the rising of the Counties *Kent* and *Surrey*, went secretly from his said Uncle, and is conceived to have engaged in the same, and to be either dead, or slain in some of those fights, having never since been heard of, either by his said Uncle, or any of his Friends. If any person can give notice of the certainty of the death of the said

George Weale, let him repair to the said Mr. *Graunt* his House in Drumalley in Drury Lane, *London;* he shall have twenty shillings for his pains.—*Mercurius Politicus,* Dec. 8, 1659.

Here at least we have probably preserved the name of one of the fameless men who were "slain in some of those fights," a phrase which in these days opens to us a chapter in romance.

With the exception of book advertisements and quack medicines, we have not up to this date met with a single instance of a tradesman turning the newspaper to account in making known his goods to the public. The very first announcement of this nature, independently of its being in itself a curiosity, possesses a very strong interest, from the fact that it marks the introduction of an article of food which perhaps more than all others has served to wean the nation from one of its besetting sins of old—drunkenness. Common report, Mr. Disraeli informs us, attributes the introduction of "the cup which cheers but not inebriates," to Lord Arlington and Lord Ossory, who are said to have brought over a small quantity from Holland in 1666. The author of the "Curiosities of Literature" does not think this statement satisfactory, and tells us that he has heard of Oliver Cromwell's teapot being in the possession of a collector. We never knew before of these teetotal habits of the Protector, but we can so far back the story as to find chronologically correct bohea to put into his pot; for though it is true that the date of the following advertisement is three weeks after the death of his highness, it refers to the article as a known and, by physicians, an approved drink, and therefore must have been some time previously on sale:—

THAT Excellent and by all Physitians approved *China* Drink called by the *Chineans Tcha,* by other Nations *Tay alias Tee,* is sold at the *Sultaness Head Cophee-House,* in *Sweetings* Rents, by the Royal Exchange, *London.*—*Mercurius Politicus,* September 30, 1658.

This is undoubtedly the earliest authentic announcement yet made known of the public sale in England of this now famous beverage. The mention of a "Cophee-house" proves that the sister stimulant was even then making way in the country.* It

* This *cophee-house* in Sweeting's Rents is not alluded to by Mr. Cunningham in his Handbook of London. He mentions the first as established in

took, however, a couple of centuries to convert them, in the extended sense of the term, into national drinks; but, like many other good things, it came too early. Tea may have sufficed for fanatics, Anabaptists, Quakers, Independents, and self-denying sectaries of all kinds; and for all we know, its early introduction, had the Commonwealth lasted, might have accelerated the temperance movement a century at least; but the wheel of fortune was about to turn once more—mighty ale had to be broached, and many deep healths to be drunk by those who had "come to their own again;" and tea, for full half a century, was washed away by brown October and the French wines that came in with the Merry Monarch.

We have now brought the reader upon the very borders of the period when Charles, with his hungry followers, landed in triumph at Dover. The advertisements which appeared during the time that Monk was temporizing and sounding his way to the Restoration, form a capital barometer of the state of feeling among political men at that critical juncture. We see no more of the old Fifth-Monarchy spirit abroad. Ministers of the steeple-houses evidently note the storm coming, and cease their long-winded warnings to a backsliding generation. Every one is either panting to take advantage of the first sunshine of royal favour, or to deprecate its wrath, the coming shadow of which is clearly seen. Meetings are advertised of those persons who have purchased sequestered estates, in order that they may address the King to secure them in possession; parliamentary aldermen repudiate by the same means, charges in the papers that their names are to be found in the list of those persons who "sat upon the tryal of the late King;" the works of "late" bishops begin again to air themselves in the Episcopal wind that is clearly setting in; and "The Tears, Sighs, Complaints, and Prayers of the Church of England" appear in the advertising columns in place of the sonorous titles of sturdy old Baxter's works. It is clear there is a great commotion at hand; the

1657, in St. Michael's Alley, Cornhill, and the second (no date mentioned) as set up at the Rainbow in Fleet Street. We think we must make way for this new discovery between the two.

leaves are rustling, and the dust is moving. In the very midst of it, however, we find one name still faithful to the "old cause," as the Puritans call it: on the 8th of March, 1660—that is, while the sway of Charles's sceptre had already cast its shadow from Breda—we find the following advertisement in the *Mercurius Politicus*:—

THE ready and easie way to establish a free Commonwealth, and the excellence thereof compared with the inconveniences and dangers of readmitting Kingship in this Nation. The Author, J. M. Wherein, by reason of the Printers haste, the Errata not coming in time, it is desired that the following faults may be amended. Page 9, line 32, for *the Areopagus* read *of Areopagus*. P. 10, l. 3, for full Senate, true Senate; l. 4, for fits, is the whole Aristocracy; l. 7, for Provincial States, States of every City. P. 17, l. 29, for *cite, citie*; l. 30, for *left, felt*. Sold by *Livewel Chapman*, at the Crown, in Pope's-head Alley.

The calmness of the blind bard in thus issuing corrections to his hastily-printed pamphlet on behalf of a falling cause, excites our admiration, and gives us an exalted idea of his moral courage. In two months, as might have been expected, he was a proscribed fugitive, sheltering his honoured head from the pursuit of Charles's myrmidons in some secret hiding-place in Westminster, whilst his works, by order of the House, were being burned by the common hangman.

The lawyers were not slow in perceiving the way the wind was blowing, and set their sails accordingly—if we may take the action of one Mr. Nicholas Bacon, as shown in the following advertisement, as any index of the feelings of his fellows:—

WHEREAS one Capt. *Gouge*, a witness examined against the late Kings Majesty, in those Records stiled himself of the Honorable Society of *Grays* Inne. These are to give notice that the said *Gouge*, being long sought for, was providentially discovered in a disguise, seized in that Society, and now in custody, being apprehended by the help of some spectators that knew him, viewing of a Banner with his Majesties arms, set up just at the same time of His Majesties landing, on an high Tower in the same Society, by *Nicholas Bacon*, Esq., a Member thereof, as a memorial of so great a deliverance, and testimony of his constant loyalty to His Majesty, and that the said *Gouge* upon examination confessed, That he was never admitted not so much as a Clerk of that Society.—*Mercurius Politicus*, June 7, 1660.

Whilst all London was throwing up caps for the restored

monarch, and England seemed so glad that he himself wondered how he could have been persuaded to stop away so long, let us catch the lost luggage of a poor cavalier, who has just followed his royal master from his long banishment, and turn out its contents for our reader, in order to show that even ruined old courtiers carried more impedimenta than the famous "shirt, towel, and piece of soap" of our renowned Napier. The *Mercurius Publicus* is now our mine, in which we sink a shaft, and come up with this fossil advertisement, which bears date July 5th, 1660 :—

A Leathern Portmantle Lost at Sittingburn *or* Rochester, *when his Majesty came thither, wherein was a Suit of Camolet Holland, with two little laces in a seam, eight pair of white Gloves, and a pair of Does leather; about twenty yards of skie-coloured Ribbon twelvepenny broad, and a whole piece of black Ribbon tenpenny broad, a cloath lead-coloured cloak, with store of linnen; a pair of shooes, slippers, a Montero, and other things; all which belong to a Gentleman (a near servant to His Majesty) who hath been too long Imprisoned and Sequestered to be now robbed when all men hope to enjoy their own. If any can give notice, they may leave word with* Mr. Samuel Merne, *His Majesties Book-binder, at his house in Little Britain, and they shall be thankfully rewarded.*

The king had not been "in" a month ere his habits appear through the public papers. The *Mercurius Politicus* is now turned courtier, and has changed its name to the *Mercurius Publicus*. Its columns, indeed, are entirely under the direction of the king, and, instead of slashing articles against malignants, degenerates into a virulent oppressor of the Puritans, and a vehicle for inquiries after his majesty's favourite dogs that have been stolen. In the number for June 28th, 1660, for instance, we find the following advertisement :—

☞ A Smooth Black DOG, less than a Grey hound, with white under his breast, belonging to the Kings Majesty, was taken from Whitehall, the eighteenth day of this instant *June*, or thereabouts. If any one can give notice to *John Ellis*, one of his Majesties servants, or to his Majesties Back-Stairs, shall be well rewarded for their labour.

It is evident that "the smooth black dog" was a very great favourite, for the next publication of the journal contains another advertisement with respect to him, printed in larger

Italic type, the diction of which, from its pleasant raillery, looks as though it had come from the king's own hand :—

☞ *We must call upon you again for a Black Dog, between a Grey-hound and a Spaniel, no white about him, onely a streak on his Brest, and Tayl a little bobbed. It is His Majesties own Dog, and doubtless was stoln, for the Dog was not born nor bred in* England, *and would never forsake his Master. Whosoever findes him may acquaint any at Whitehal, for the Dog was better known at Court than those who stole him. Will they never leave robbing His Majesty? must he not keep a Dog? This Dogs place (though better than some imagine) is the only place which nobody offers to beg.*

Pepys, about this time, describes the king with a train of spaniels and other dogs at his heels, lounging along and feeding the ducks in St. James's Park; and on occasions still later he was often seen talking to Nelly, as she leaned from her garden-wall that abutted upon the Pall-Mall, whilst his canine favourites grouped around him. On these occasions perhaps the representatives of those gentlemen to be seen in Regent-street, with two bundles of animated wool beneath their arms, were o[illegible]look-out, as we find his majesty continually advertising [illegible]s. Later we find him inquiring after "a little brindled [illegible]hound bitch, having her two hinder feet white;" for a "white-haired spaniel, smooth-coated, with large red or yellowish spots," and for a "black mastiff dog, with cropped ears and cut tail." And when royalty had done, his Highness Prince Rupert, or Buckingham, or "my Lord Albemarle," resorted to the *London Gazette* to make known their canine losses. We think the change in the temper of the age is more clearly marked by these dog advertisements than by anything else. The Puritans did not like sporting animals of any kind, and we much question whether a dog would have followed a fifth-monarchy-man. Hence the total absence of all advertisements bearing upon the "fancy." Now that the king had returned, the old English love of field-sports spread with fourfold vigour. We chance upon the traces too of a courtly amusement which had been handed down from the middle ages, and was then only lingering amongst us—hawking. Here is an inquiry after a lost lanner :—

Richard Finney, Esquire, of Alaxton, in Leicestershire, about a fortnight since lost a LANNER from that place; she hath neither Bells nor Varyels; she is a white Hawk, and her long feathers and sarcels are both in the blood. If any one give tidings thereof to Mr. Lambert at the golden Key in Fleet-street, they shall have forty shillings for their pains.—*Mercurius Publicus*, September 6, 1660.

As London was the only place in which a newspaper was published during the reign of Charles, and indeed for nearly fifty years afterwards, the hue and cry after lost animals always came to town, as a matter of course. It sounds strange to read these advertisements of a sport the very terms of which are now unintelligible to us. What ages seem to have passed since these birds, in all the glory of scarlet hoods, were carried upon some "faire lady's" wrist, or poised themselves, with fluttering wing, as the falconer uncovered them to view their quarry! We have skipped a few years, in order to afford o[illegible] two more examples of these picturesque advertisements, [illegible]ent from anything to be seen at the present day :—

LOST on the 30 of October, 1665, an Inte[illegible]arbary Tercel Gentle, engraven in Varvels, Richard Wit[illegible] of Ditton Park, in the County of Bucks, Esq. For more particu[illegible]ks—if the Varvels be taken off—the 4th feather in one of the wings Imped, and the third pounce of the right foot broke. If any one inform Sir William Roberts, Knight and Baronet (near Harrow-on-the-Hill, in the County of Middlesex), or Mr. William Philips, at the King's Head in Paternoster Row, of the Hawk, he shall be sufficiently rewarded.—*The Intelligencer*, Nov. 6, 1665.

The next paper contains an inquiry for a goshawk belonging to Lord William Petre, and two years later a royal bird is inquired after in the *London Gazette*, as follows :—

A Sore ger Falcon of His Majesty, lost the 13 of August, who had one Varvel of his Keeper, Roger Higs, of Westminster, Gent. Whosoever hath taken her up and give notice Sir Allan Apsley, Master of His Majesties Hawks at St. James's, shall be rewarded for his paines. Back-Stairs in Whitehall.

This Sir Allan Apsley is the brother of Mrs. Hutchinson, who has given us such a vivid picture, in the memoir of her husband, of the Commonwealth time. The *London Gazette*, from which we quote, is the only paper still in existence that had its root in those days. It first appeared in Oxford, upon

the Court taking up its abode in that city during the time of the Great Plague, and was therefore called the *Oxford Gazette*. On the return of Charles to London it followed in his train, and became the *London Gazette*, or Court and official paper, and the latter character it has retained to the present hour. The gazettes of the seventeenth century were widely different from those of our day. They contain foreign news, as well as state papers, royal proclamations, &c., and, stranger still, miscellaneous advertisements are mixed up with those upon the business of the Court. The quack doctors, with an eye, we suppose, to the "quality," were the first to avail themselves of its pages to make known their nostrums. It will astonish our readers to find what an ancestry some of the quack medicines of the present day have had. "Nervous powders," specifics for gout [redacted]matism, &c., seized upon the columns of the news-pa[redacted]ost as early as they were published. Here is a speci[redacted]ich might still serve as a model for such announcements

*Gentlem[redacted]*ou are desired to take notice, That Mr. *Theophilus Buckworth* doth at his house on *Mile-end Green* make and expose to sale, for the publick good, those so famous *Lozenges* or *Pectorals* approved for the cure of Consumptions, Coughs, Catarrhs, Asthmas, Hoarness, Strongness of Breath, Colds in general, Diseases incident to the Lungs, and a sovoraign Antidote against the Plague, and all other contagious Diseases and obstructions of the Stomach: And for more convenience of the people, constantly leaveth them sealed up with his coat of arms on the papers, with Mr. *Rich. Lowndes* (as formerly), at the sign of the White Lion, near the little north door of *Pauls Church*; Mr. *Henry Seile*, over against *S. Dunstan's* Church in Fleet Street; Mr. *William Milward*, at *Westminster* Hall Gate; Mr. *John Place*, at *Furnival's Inn Gate*, in Holborn; and Mr. *Robert Horn*, at the Turk's-head near the entrance of the Royal Exchange, Booksellers, and no others.

This is published to prevent the designs of divers Pretenders, who counterfeit the said Lozenges, to the disparagement of the said Gentleman, and great abuse of the people. — *Mercurius Politicus*, Nov. 16, 1660.

The next is equally characteristic:—

MOST Excellent and Approved *Dentifrices* to scour and cleanse the Teeth, making them white as Ivory, preserves from the Toothach; so that, being constantly used, the parties using it are never troubled with the Toothach: It fastens the Teeth, sweetens the Breath, and preserves the Gums and Mouth from Cankers and Imposthumes.

Made by *Robert Turner*, Gentleman; and the right are onely to be had at *Thomas Rookes*, Stationer, at the Holy Lamb at the east end of St. Paul's Church, near the School, in sealed papers, at 12*d.* the paper.

The reader is desired to beware of counterfeits.

(*Mercurius Politicus*, Dec. 20, 1660.)

Other advertisements about this time profess to cure all diseases by means of an "antimonial cup." Sir Kenelm Digby, the same learned knight who feasted his wife upon capons fattened upon serpents, in order to make her fair, advertises a book in which he professes to show a method of curing wounds by a powder of sympathy; and here is a notification of a remedy which shows still more clearly the superstitious character of the age :—

SMALL BAGGS to hang about Children's necks, which are excellent both for the *prevention and cure* of the *Rickets*, and to ease children in breeding of Teeth, are prepared by Mr. Edmund Buckworth, and constantly to be had at Mr. Philip Clark's, Keeper of the Library in the Fleet, and nowhere else, at 5 shillings a bagge.—*The Intelligencer*, Oct. 16, 1664.

It was left, however, to the reign of Anne for the mountebank to descend from his stage in the fair and the market-place, in order to erect it in the public newspapers. But we have yet to mention one, who might appear to some to be the greatest quack of all, and who about this time resorted to an advertisement in the newspapers to call his patients to his doors;—the royal charlatan, who touched for the evil, makes known that he is at home for the season to his people through the medium of the *Public Intelligencer* of 1664 :—

WHITEHALL, May 14, 1664. His Sacred Majesty, having declared it to be his Royal will and purpose to continue the healing of his people for the Evil during the Month of May, and then to give over till Michaelmas next, I am commanded to give notice thereof, that the people may not come up to Town in the Interim and lose their labour.

No doubt there was much political significance in this pretended efficacy of the royal touch in scrofulous afflictions; at the same time, there is reason to believe that patients did sometimes speedily recover after undergoing the regal contact. Dr. Tyler Smith, who has written a very clever little book on the subject,

boldly states his belief that the emotion felt by these poor stricken people who came within the influence of "that divinity which doth hedge a king," acted upon them as a powerful mental tonic; in a vast number of cases, however, we might impute the tonic to the gold coin which the king always bestowed upon his patient. Be that as it may, the practice flourished down to the time of Anne, at whose death it stopped; the sovereigns of the line of Brunswick never pretending to possess this medicinal virtue, coming as they did to the throne by only a parliamentary title. The reaction from the straightlaced times of the Commonwealth, which set in immediately upon the Restoration, seems to have arrived at its height about the year 1664, and the advertisements at that period reflect very truly the love of pleasure and excitement which seized hold of the people, as if they were bent on making up for the time that had been lost during the Puritanic rule. They are mostly taken up, in fact, with inquiries after "lost lace-work;" announcements of lotteries in the Banqueting Hall at Whitehall, of jewels, tapestry, and lockets of "Mr. Cooper's work," of which the following is a fair specimen:—

LOST, on the 27th of July, about Boswell Yard or Drury Lane, a Ladyes Picture, set in gold, and three Keys, with divers other little things in a perfumed pocket. Whosoever shall give notice of or bring the said picture to Mr. Charles Coakine, Goldsmith, near Staples Inne, Holborn, shall have 4 times the value of the gold for his payns.—*The News*, August 4, 1664.

The love of the people also for the strange and marvellous is shown by announcements of rare sights; for instance, we are told that,—

AT the Mitre, near the west end of St. Paul's, is to be seen a rare Collection of Curiosityes, much resorted to and admired by persons of great learning and quality, among which a choyce Egyptian Mummy, with hieroglyphicks; the Ant-Beare of Brasil; a Remora; a Torpedo; the Huge Thigh-bone of a Giant; a Moon Fish; a Tropic Bird, &c.—*The News* of June 2, 1664.

A rather scanty collection of articles, it is true, but eked out monstrously by the "huge thigh-bone of a giant," which in all probability belonged to some huge quadruped. The ignorance

of those times with respect to natural history must have been something astonishing, as about the same date we find the following print of what were evidently considered very curious animals advertised in the *London Gazette* :—

A True Representation of the Rhonoserous and Elephant, lately brought from the East Indies to London, drawn after the life, and curiously engraven in Mezzotinto, printed upon a large sheet of paper. Sold by PIERCE TEMPEST, at the Eagle and Child in the Strand, over against Somerset House, Water Gate.—The *London Gazette*, Jan. 22, 1664.

In the succeeding year all advertisements of this kind stop; amusements, from some great disturbing cause, have ceased to attract; there is no more gambling under the name of lotteries at Whitehall; no more curiosities are exhibited to a pleasure-loving crew; no more books of amorous songs are published; no more lockets or perfumed bags are dropped; all is stagnation and silence, if we may judge as much from the sudden cessation of advertisements with reference to them in the public papers. Death now comes upon the stage, and rudely shuts the box of Autolycus, crops the street with grass, and marks a red cross on every other door. It is the year of the Great Plague. Those who could, fled early from the pest-stricken city; those who remained until the malady had gained irresistible sway were not allowed to depart, for fear of carrying the contagion into the provinces, the Lord Mayor denying to such a clean bill of health, in consequence of which they were driven back by the rustics as soon as discovered. A singular instance also of the vigilance of the authorities in confining, as they imagined, the mischief within the limits of the metropolis is afforded by the succeeding advertisement :—

Nicholas Hurst, an Upholsterer, over against the Rose Tavern, in Russell-street, Covent-Garden, whose Maid Servant dyed lately of the Sickness, fled on Monday last out of his house, taking with him several Goods and Household Stuff, and was afterwards followed by one Doctor Cary and Richard Bayle, with his wife and family, who lodged in the same house; but Bayle having his usual dwelling-house in Waybridge, in Surrey. Whereof we are commanded to give this Public Notice, that diligent search may be made for them, and the houses in which any of their persons or goods shall be found may be shut up by the next Justice of the Peace, or other his Majesty's Officers of Justice, and notice immediately given to some of his Majesty's Privy Councill, or to one of his Majesty's principal Secretaries of State.—*London Gazette*, May 10, 1666.

Antidotes and remedies for the plague are also commonly advertised, just as the visitation of the cholera in 1854 filled the columns of the *Times* full of all sorts of specifics. Thus, for example, the *Intelligencer* of August the 28th, 1665, announces "an excellent electuary against the plague, to be drunk at the Green Dragon, Cheap-side, at sixpence a pint." The great and only cure, however, for this fearful visitation, which carried off a hundred thousand persons in London alone, was at hand—the purgation of fire. The conflagration, which burst out on the 2nd of September, and destroyed thirteen thousand houses, gave the final blow to its declining attacks. Singularly enough, but faint traces of this overwhelming calamity, as it was considered at the time, can be gathered from the current advertisements. Although the entire population of the city was rendered houseless, and had to encamp in the surrounding fields, where they extemporized shops and streets, not one hint of such a circumstance can be found in the public announcements of the period. No circumstance could afford a greater proof of the little use made by the trading community of this means of publicity in the time of Charles II. If a fire only a hundredth-part so destructive were to occur in these days, the columns of the press would immediately be full of the new addresses of the burnt-out shopkeepers; and those who were not even damaged by it would take care to "improve the occasion" to their own advantage. We look in vain through the pages of the *London Gazette* of this and the following year for one such announcement: not even a tavern-keeper tells us the number of his booth in Goodman's Fields, although quack medicine flourished away in its columns as usual. In 1667 we see a notification, now and then, of some change in the site of a government office, or of the intention to build by contract some public structure, such as the following notice relative to the erection of the old Royal Exchange:—

ALL Artificers of the several Trades that must be used in Rebuilding the Royal Exchange may take notice, that the Committee appointed for Management of that Work do sit at the end of the long gallery in Gresham Colledge every Monday in the forenoon, there and then to treat with such as are fit to undertake the same.

The remainder of the reign of Charles is unmarked by the appearance of any characteristic advertisements which give a clue to the peculiar complexion of the time. If we go back two or three years, however, we shall find one which bears upon the introduction of those monstrous flowing wigs which continued in fashion to the middle of the succeeding century :—

WHEREAS *George Grey*, a Barber and Perrywigge-maker, over against the *Greyhound Tavern*, in *Black Fryers, London*, stands obliged to serve some particular persons of eminent Condition and Quality in his way of Employment: It is therefore notifyed at his desire, that any one having long flaxen hayr to sell may repayr to him the said *George Grey*, and they shall have 10*s* the ounce, and for any other long fine hayr after the Rate of 5*s*. or 7*s*. the ounce.—*The Newes*, February 4, 1663.

Pepys describes, with amusing minuteness, how Chapman the periwig-maker cut off his hair to make up one of these portentous head-dresses for him, much to the trouble of his servants, Jane and Bessy; and on the Lord's day, November 8th, 1663, he relates, with infinite *naïveté*, his entrance into church with what must evidently have been the perruquier's latest fashion. "To church, where I found that my coming in a periwig did not prove so strange as I was afraid it would; for I thought that all the church would presently have cast their eyes upon me, but I find no such thing." Ten shillings the ounce for long flaxen hair shows the demand for this peculiar colour by "persons of eminent condition and quality." We have shown, from the advertisements of the time of Charles II., what was indeed well known, that the age was characterized by frivolous amusements, and by a love of dress and vicious excitement, in the midst of which pestilence stalked like a mocking fiend, and the great conflagration lit up the general masquerade with its lurid and angry glare. Together with the emasculate tone of manners, a disposition to personal violence and a contempt of law stained the latter part of this and the succeeding reign. The audacious seizure of the crown jewels by Blood; the attack upon the Duke of Ormond by the same desperado, that nobleman actually having been dragged from his coach in St. James's Street in the evening, and carried, bound, upon the saddle-bow of Blood's horse, as far as Hyde Park Corner, before he could be rescued;

the slitting of Sir John Coventry's nose in the Haymarket by the king's guard; and the murder of Sir Edmondbury Godfrey on Primrose Hill, are familiar instances of the prevalence of this lawless spirit.

We catch a glimpse of one of these street outrages in the following announcement of an assault upon glorious John :—

WHEREAS *John Dryden, Esq.*, was on Monday, the 18th instant, at night, barbarously assaulted and wounded, in Rose Street in Covent Garden, by divers men unknown; if any person shall make discovery of the said offenders to the said Mr. Dryden, or to any Justice of the Peace, he shall not only receive Fifty Pounds, which is deposited in the hands of Mr. Blanchard, Goldsmith, next door to Temple Bar, for the said purpose, but if he be a principal or an accessory in the said fact, his Majesty is graciously pleased to promise him his pardon for the same. —*The London Gazette*, Dec. 22, 1679.

And here is another of a still more tragic character :—

WHEREAS a Gentleman was, on the eighteenth at night, mortally wounded near Lincoln's Inn, in Chancery Lane, in view, as is supposed, of the coachman that set him down: these are to give notice that the said coachman shall come in and declare his knowledge of the matter; if any other person shall discover the said coachman to John Hawles, at his chamber in Lincoln's Inn, he shall have 5 guineas reward.— *London Gazette*, March 29th, 1688.

To this period also may be ascribed the rise of that romantic felon, the highwayman. The hue and cry after these genteel robbers is frequently raised during the reign of James II. In one case we have notice of a gentleman having been stopped, robbed, and then bound, by mounted men at Islington, who rode away with his horse; another time these daring gentry appeared at Knightsbridge; and a third advertisement, of a later date it is true, offers a reward for three mounted Macheaths, who were charged with stopping and robbing three young ladies in South Street, near Audley Chapel, as they were returning home from visiting. The following is still more singular, as showing the high social position of some of these gentlemen who took to the "road" for special purposes :—

WHEREAS *Mr. Herbert Jones*, Attorney-at-law in the town of Monmouth, well known by being several years together Under-Sheriff of the same County, hath of late divers time robbed the Mail coming from that town to London, and taken out divers letters and writs, and is

now fled from justice, and supposed to have sheltered himself in some of the new-raised troops. These are to give notice, that whosoever shall secure the said Herbert Jones, so as to be committed in order to answer these said crimes, may give notice thereof to Sir Thomas Fowles, goldsmith, Temple-bar, London, or to Mr. Michael Bohune, mercer, in Monmouth, and shall have a guinea's reward.

The drinking tendencies of these Jacobite times are chiefly shown by the numberless inquiries after lost or stolen silver tankards, and by the sales of claret and canary which constantly took place. The hammer was not apparently used at that time, as we commonly find announcements of sales by "inch of candle," a term which mightily puzzled us until we saw the explanation of it in our constant book of reference, the Diary of Pepys :—

"After dinner we met and sold the Weymouth, Successe, and Fellowship hulkes; where pleasant to see how backward men are at first to bid; and yet, when the candle is going out, how they bawl, and dispute afterwards who bid the most. And here I observed one man cunninger than the rest, that was sure to bid the last man and to carry it; and inquiring the reason he told me that, just as the flame goes out, the smoke descends, which is a thing I never observed before, and by that he do know the instant when to bid last." (Sept. 3rd, 1662).

The taste for auctions, which became such a rage in the time of Anne, had its beginning about this period. Books and pictures are constantly advertised to be disposed of in this manner. The love of excitement born in the gaming time of the Restoration might be traced in these sales, and in the lotteries, or "adventures" as they were sometimes termed, which extended to every conceivable article capable of being sold. The rising taste of the town was, however, checked for the time by the Revolution, which was doubtless hastened on by such announcements as the following, which appeared in the *Gazette* of March 1, 1688 :—

CATHOLIC LOYALTY, ☞ upon the subject of Government and Obedience, delivered in a SERMON before the King and Queen, in His Majesties Chapel at Whitehall, on the 13 of June, 1687, by the Revnd. Father Edward Scaraisbroke, priest of the Society of Jesus. Published by His Majesty's Command. Sold by Raydal Taylor, near Stationers Hall, London.

Up to this time advertisements only appeared in threes and fours, and rarely, if ever, exceeded a dozen, in any newspaper of

the day. They were generally stuck in the middle of the diminutive journal, but sometimes formed a tail-piece to it. They were confined in their character, and gave no evidence of belonging to a great commercial community. Now and then, it is true, sums of money were advertised as seeking investment; more constantly a truss for a "broken belly," or an "excellent dentifrice," appeared; or some city mansion of the nobility is advertised to let, showing the progress westward even then, as witness the following:—

THE EARL of BERKELEY'S HOUSE, with Garden and Stables in St. John's Lane, not far from Smith Field, is to be Let or Sold for Building. Enquire of Mr. Prestworth, a corn chandler, near the said house, and you may know further.—*London Gazette*, August 17, 1685.

Here is an instance of the singular manner in which fire-insurances were conducted in that day:—

THERE having happened a fire on the 24th of the last month by which several houses of the friendly society were burned to the value of 965 pounds, these are to give notice to all persons of the said society that they are desired to pay at the office Faulcon Court in Fleet Street their several proportions of their said loss, which comes to five shillings and one penny for every hundred pounds insured, before the 12th of August next.—*London Gazette*, July 6th, 1685.

Sometimes it is a "flee-bitten grey mare" stolen out of "Mary-le-bone Park," or a lost lottery-ticket, or a dog, that is inquired after; but they contained no hint that England possessed a commercial marine, or that she was destined to become a nation of shopkeepers. As yet, too, there was no sign given of that wonderful art of ingenious puffing which now exists, and which might lead a casual observer to imagine that the nation consisted of only two classes—cheats and dupes.

From the settlement of 1688 the true value of the advertisement appears to have dawned upon the public. The country evidently began to breathe freely, and with Dutch William and Protestant ascendancy, the peculiar character of the nation burst forth with extraordinary vigour. Enterprise of all kinds was called forth, and cast its image upon the advertising columns of the public journals, now greatly increased both in size and in numbers, no less than twenty-six having been set up within

four years after the Revolution. It is observable, too, that from this political convulsion dates a certain rough humour, which, however latent, was not before expressed in the public papers, especially on matters political. Let us further elucidate our meaning by quoting the following from the *New Observator* of July 17, 1689, setting forth a popular and practical method of parading the Whig triumph :—

ORANGE CARDS, representing the late King's reign and expedition of the Prince of Orange: viz. The Earl of Essex Murther, Dr. Otes Whipping, Defacing the Monument, My Lord Jeffries in the West hanging of Protestants, Magdalen College, Trial of the Bishops, Castle Maine at Rome, the Popish Midwife, A Jesuit Preaching against our Bible, Consecrated Smock, My Lord Chancellor at the Bed's feet, Birth of the Prince of Wales, The Ordinaire Mass-house pulling down and burning by Captain Tom and his Mobile, Mortar pieces in the Tower, The Prince of Orange Landing, The Jesuits Scampering, Father Peter's Transactions, The Fight at Reading, The Army going over to the Prince of Orange, Tyrconnel in Ireland, My Lord Chancellor in the Tower. With many other remarkable passages of the Times. To which is added the efigies of our Gracious K. William and Q. Mary, curiously illustrated and engraven in lively figures, done by the performers of the first Popish Plot Cards. Sold by Donnan Newman, the publisher and printer of the New Observator.

The editor of the *New Observator* was Bishop Burnet, and these political playing-cards were sold by his publisher; perhaps the great Protestant bishop knew something of their "performers." In the year 1692 an experiment was made which clearly shows how just an estimate was getting abroad of the value of publicity in matters of business. A newspaper was set up, called "The City Mercury, published gratis for the Promotion of Trade," which lasted for two years, and contained nothing but advertisements. The proprietor undertook to distribute a thousand copies per week to the then chief places of resort,—coffee houses, taverns, and bookshops, Even in these days of the "Times" double supplement such an experiment has often been made and failed; our wonder, therefore, is not that the *City Mercury* went to that limbo which is stored with such countless abortive journals, but that the interest felt in advertisements should, at that early period, have kept it alive so long.

If the foregoing scheme proves that an attempt was then made to subdivide the duties of a newspaper—that of keeping

its readers informed of the news of the day, and of forming a means of publicity for the wants and losses of individuals—the advertisement we are about to quote clearly shows that at the same time there was a plan in existence for combining the printed newspaper with the more ancient written newsletter. It is well known that long after the institution of public journals the old profession of the newsletter-writer continued to flourish. We can easily account for this fact when we remember that during the heat of a great rebellion it was much more safe to write than to print the intelligence of the day. Many of these newsletters were written by strong partisans, and contained information which it was neither desirable nor safe that their opponents should see. They were passed on from hand to hand in secret, and often endorsed by each successive reader. We are told that the Cavaliers, when taken prisoners, have been known to eat their newsletters; and some of Prince Rupert's, which had been intercepted, are still in existence, and bear dark-red stains, which testify to the desperate manner in which they were defended. It is pretty certain, however, that, as a profession, newsletter-writing began to decline after the Revolution; although we find the editor of the *Evening Post*, as late as the year 1709, reminding its readers that "there must be three or four pounds a year paid for written news." At the same time the public journals, it is clear, had not performed that part of their office which was really more acceptable to the country reader than any other—the retailing the political and social chit-chat of the day. We have only to look into the public papers to convince ourselves how wofully they fell short in a department which must have been the staple of the news-writer. This want still being felt, John Salusbury devises a scheme to combine the old and the new plan after the following manner, as announced in the *Flying Post* of 1694:—

IF any Gentleman has a mind to oblige his country friend or correspondent with the Account of Public Affairs, he may have it for twopence of J. Salusbury at the Rising-Sun in Cornhill, on a sheet of fine paper, half of which being blank, he may thereon write his own private business or the material news of the day.

It does not say much for the energy with which the journals of that day were conducted, that the purchasers are invited to write therein "the material news of the day;" that, we should have thought, was the editor's business to have supplied; but it was perhaps a contrivance by which the Jacobites might circulate information, by means of the post, without compromising the printer. We have seen many such papers, half print, half manuscript, in the British Museum, which had passed through the post, the manuscript portion of which, the Home Secretaries of our time would have thought sufficiently treasonable to justify them in having broken their seals.

As advertisements, from their earliest introduction, were used to make known the amusements of the day and the means of killing time at the disposal of persons of quality, it seems strange that it was not employed sooner than it was to draw a company to the theatres. We have looked in vain for the announcement of any theatrical entertainment before the year 1701, when the advertisement of the Lincoln's Inn Theatre makes its appearance in the columns of the *English Post*. The lead of this little house was, however, speedily followed by the larger ones, and only a few years later we have regular lists of the performances at all the theatres in the daily papers. The first journal of this description was the *Daily Courant*, published in 1709. In this year also appeared the celebrated "Tatler," to be speedily followed by the "Spectator" and "Guardian," the social and literary journals of that Augustine age. The first edition of the "Tatler," in the British Museum, contains advertisements like an ordinary paper, and they evidently reflect, more than those of its contemporaries, the flying fashions of the day and the follies of the "quality." In them we notice the rage that existed for lotteries, or "sales," as they were called. Every conceivable thing was put up to raffle. We see advertisements headed "A Sixpenny Sale of Lace," "A Hundred Pounds for Half-a-crown," "A Penny Adventure for a Great Pie," "A Quarter's Rent," "A Freehold Estate," "Threepenny Sales of Houses," "A fashionable Coach." Gloves, looking-glasses, chocolate, Hungary water, Indian goods, lacquered ware, fans, &c., were

notified to be disposed of in this manner, and the fair mob was called together to draw their tickets by the same means. This fever, which produced ten years later the celebrated South Sea Bubble, was of slow growth. It had its root in the Restoration, its flower in the reign of Anne, and its fruit and *dénouement* in the reign of George I. Before passing on from the pages of the "Tatler," we must stop for a moment to notice one or two of those playful advertisements which Sir Richard Steele delighted in, and which, under the disguise of fun, perhaps really afforded him excellent matter for his journal. Here is an irresistible invitation to his fair readers :—

ANY Ladies who have any particular stories of their acquaintance which they are willing privately to make public, may send 'em by the penny post to Isaac Bickerstaff, Esq., enclosed to Mr. John Morpheu, near Stationers' Hall.—*Tatler*, May 8, 1709.

An excellent lion's mouth this wherein to drop scandal. A still more amusing instance of the fun that pervaded Isaac Bickerstaff, Esq., is to be found in the series of advertisements in which he ought to have convinced John Partridge, the astrologer, that he really had departed this life ; an assertion which the latter persisted in denying with the most ludicrous earnestness. Of these we give one from the "Tatler" of August 24th 1710 :—

WHEREAS an ignorant Upstart in Astrology has publicly endeavoured to persuade the world that he is the late John Partridge, who died the 28 of March 1718, these are to certify all whom it may concern, that the true John Partridge was not only dead at that time, but continues so to the present day. Beware of counterfeits, for such are abroad.

The pleasant malice of the above is patent enough, but we confess we are puzzled to know whether the following is genuine or not. We copied it from among a number of others, from which it was undistinguishable by any peculiarity of type :—

The Charitable Advice Office, where all persons may have the opinion of dignified Clergymen, learned Council, graduate Physicians, and experienced Surgeons, to any question in Divinity, Morality, Law, Physic, or Surgery, with proper Prescriptions within twelve hours after they have delivered in a state of their case. Those who can't write may

have their cases stated at the office. * * The fees are only 1*s.* at delivery, or sending your case, and 1*s.* more on re-delivering that and the opinion upon it, being what is thought sufficient to defray the necessary expense of servants and office-rent.—*Tatler*, December 16, 1710.

To pass, however, from the keen weapons of the brain to those of the flesh, it is interesting to fix with some tolerable accuracy the change which took place in the early part of the eighteenth century in what might be called the amusements of the fancy. The "noble art of defence," as it was termed, up to the time of the first George seems to have consisted in the broad-sword exercise. Pepys describes in his "Diary" several bloody encounters of this kind which he himself witnessed; and the following advertisement, a half-century later, shows that the skilled weapon had not at that time been set aside for the more brutal fist :—

A *Tryal of Skill* to be performed at His Majesty's Bear Garden in Hockley-in-the-Hole, on Thursday next, being the 9th instant, betwixt these following masters :—Edmund Button, master of the noble science of defence, *who hath lately cut down* Mr. Hasgit and the Champion of the West, *and* 4 *besides*, and James Harris, an Herefordshire man, master of the noble science of defence, who has fought 98 prizes and never was worsted, to exercise the usual weapons, at 2 o'clock in the afternoon precisely.—*Postman*, July 4, 1701.

The savage character of the time may be judged from this public boast of Mr. Edmund Button that he had cut down six men with a murderous weapon. We question, however, if the age which could tolerate such ruffianism was not exceeded by the change which substituted the fist for the sword, and witnessed women entering the ring in the place of men. Some of the earliest notices of boxing-matches upon record, singularly enough, took place between combatants of the fair sex. In a public journal of 1722, for instance, we find the following gage of battle thrown down, and accepted :—

CHALLENGE. — I, Elizabeth Wilkinson, of Clerkenwell, having had some words with Hannah Hyfield, and requiring satisfaction, do invite her to meet me upon the stage, and box me for three guineas; each woman holding half-a-crown in each hand, and the first woman that drops the money to lose the battle.

ANSWER.—I, Hannah Hyfield, of Newgate Market, hearing of the resoluteness of Elizabeth Wilkinson, will not fail, *God willing*, to give her more blows than words, desiring home blows, and from her no favour: she may expect a good thumping!

The half-crowns in the hands was an ingenious device to prevent scratching! A still more characteristic specimen of one of these challenges to a fisticuff between two women is to be found in the *Daily Post* of July 7th, 1728 :—

AT *Mr. Stokes' Amphitheatre* in Islington Road, this present Monday, being the 7 of October, will be a complete Boxing Match by the two following Championesses:—Whereas I, Ann Field, of Stoke Newington, ass-driver, well known for my abilities in boxing in my own defence wherever it happened in my way, having been affronted by Mrs. Stokes, styled the European Championess, do fairly invite her to a trial of her best skill in Boxing for 10 pounds, fair rise and fall; and question not but to give her such proofs of my judgement that shall oblige her to acknowledge me Championess of the Stage, to the entire satisfaction of all my friends.

I, Elizabeth Stokes, of the City of London, have not fought in this way since I fought the famous boxing-woman of Billingsgate 29 minutes, and gained a complete victory (which is six years ago); but as the famous Stoke Newington ass-woman dares me to fight her for the 10 pounds, I do assure her I will not fail meeting her for the said sum, and doubt not that the blows which I shall present her with will be more difficult for her to digest than any she ever gave her asses.—*Note.* A man, known by the name of Rugged and Tuff, challenges the best man of Stoke Newington to fight him for one guinea to what sum they please to venture. N.B. Attendance will be given at one, and the encounter to begin at four precisely. There will be the diversion of Cudgel-playing as usual.

Other advertisements about this time relate to cock-matches, sometimes "to last the week," to bull-baiting, and, more cruel still, to dressing up mad bulls with fireworks, in order to worry them with dogs. The brutal tone of manners, which set in afresh with the Hanoverian succession, might be alone gathered from the so-called sporting advertisements of the day; and we now see that Hogarth, in his famous picture, had no need to, and probably did not, draw upon his imagination for the combination of horrid cruelties therein depicted.

The very same tone pervaded the gallantry of the day, and we print two advertisements, one of the time of Anne, and the other of the age we are now illustrating, in order to contrast their spirit. We give the more polished one precedence:—

A GENTLEMAN who, the twentieth instant, had the hõnour to conduct a lady out of a boat at Whitehall-stairs, desires to know where he may wait on her to disclose a matter of concern. A letter directed to Mr. Samuel Reeves, to be left with Mr. May, at the Golden Head, the upper end of New Southampton Street, Covent Garden.—*Tatler*, March 21, 1709.

A certain courtly style and air of good breeding pervades this advertisement, of which Sir Richard Steele himself need not have been ashamed; but what a falling-off is here!—

WHEREAS a young lady was at Covent Garden playhouse last Tuesday night, and received a blow with a square piece of wood on her breast; if the lady be single, and meet me on Sunday, at two o'clock, on the Mall in St. James's Park, or send a line directed for A. B., to Mr. Jones's, at the Sun Tavern in St. Paul's Churchyard, where and when I shall wait on her, to inform her of something very much to her advantage on honourable terms, her compliance will be a lasting pleasure to her most obedient servant.—*General Advertiser*, Feb. 8, 1748.

It would seem as though the beau had been forced to resort to a missile to make an impression, and then felt the necessity of stating that his intentions were "honourable," in order to secure an interview with his *innamorata*. Imagine, too, the open unblushing manner in which the assignation is attempted! We are far from saying that such matters are not managed now through the medium of advertisements, for we shall presently show they are, but in how much more carefully concealed a manner! The perfect contempt of public opinion, or rather the public acquiescence in such infringements of the moral law, which it exhibits, proves the general state of morality more than the infringements themselves, which obtain more or less at all times. Two of the causes which led to this low tone of manners with respect to women were doubtless the detestable profligacy of the courts of the two first Georges, and the very defective condition of the existing marriage law. William and Mary, and Anne, had, by their decorous, not to say frigid lives, redeemed the crown, and, in some measure, the aristocracy, from the vices of the Restoration. Crown, court, and quality, however, fell into a still worse slough on the accession of the Hanoverian king, who soiled afresh the rising tone of public life by his scandalous connection with the Duchess of Kendal and the Countess of Darlington; whilst his son and successor was absolutely abetted in his vicious courses by his own queen, who promoted his commerce with his two mistresses, the Countesses of Suffolk and Yarmouth. The degrading influence of the royal manners was well seconded by the condition of the

law. Keith's chapel in May Fair, and that at the Fleet, were the Gretna Greens of the age, where children could get married at any time of the day or night for a couple of crowns. It was said at the time, that at the former chapel six thousand persons were annually married in this off-hand way; the youngest of the beautiful Miss Gunnings was wedded to the Duke of Hamilton, at twelve o'clock at night, with a ring off the bed-curtain, at this very "marriage-shop." The fruits of such unions may be imagined. The easy way in which the marriage bond was worn and broken through is clearly indicated by the advertisements which absolutely crowd the public journals from the accession of the House of Brunswick up to the time of the third George, of husbands warning the public not to trust their runaway wives.

We have referred, in an early part of this paper, to the taste for blackamoors, which set in the reign of Charles II., and went on increasing until the middle of the next century, at which time there must have been a very considerable population of negro servants in the metropolis. At first the picturesque natives of the East were pressed into the service of the nobility and gentry, and colour does not appear to have been a *sine quâ non*. Thus we have in the *London Gazette* of 1688 the following hue-and-cry advertisement:—

RUN away from his master, Captain St. Lo, the 21st instant, Obdelah Ealias Abraham, a Moor, swarthy complexion, short frizzled hair, a gold ring in his ear, in a black coat and blew breeches. He took with him a blew Turkish watch-gown, a Turkish suit of clothing that he used to wear about town, and several other things. Whoever brings him to Mr. Lozel's house in Green Street shall have one guinea for his charges.

The next advertisement we find also relates to what we must consider an East Indian. The notion of property in these boys seems to have been complete; their masters put their names upon their collars, as they did upon their setters or spaniels:—

A BLACK boy, an Indian, about thirteen years old, run away the 8th instant from Putney, with a collar about his neck with this inscription: 'the Lady Bromfield's black in Lincoln's Inn Fields.' Whoever brings him to Sir Edward Bromfield's at Putney shall have a guinea reward.—*The London Gazette*, 1694.

The traffic in African blacks, which commenced towards the end of the seventeenth century, seems to have displaced these eastern servitors towards the end of the century, for henceforth the word negro, blackamoor, or black boy, is invariably used. No doubt the fashion for these negroes and other coloured attendants was derived from the Venetian Republic, the intercourse of whose merchants with Africa and India naturally led to their introduction. Titian and other great painters of his school continually introduced them in their pictures, and our own great bard has for ever associated the Moor with the City in the Sea. In England the negro boys appear to have been considered as much articles of sale as they would have been in the slave-market at Constantinople. In the *Tatler* of 1709 we find one offered to the public in the following terms :—

A BLACK boy, twelve years of age, fit to wait on a gentleman, to be disposed of at Denis's Coffee-house in Finch Lane, near the Royal Exchange.

Again, in the *Daily Journal* of September 28th, 1728, we light upon another :—

TO be sold, a negro boy, aged eleven years. Enquire of the Virginia Coffee-house in Threadneedle Street, behind the Royal Exchange.

These were the overflowings of that infamous traffic in negroes, commenced by Sir John Hawkins in the year 1680, which tore from their homes, and transferred to Jamaica alone, no less than 910,000 Africans between that time and the year 1786, when the slave-trade was abolished.

We have brought the reader up to the date of the final battle which extinguished the hopes of the Stuarts and settled the line of Brunswick firmly on the throne. The year 1745 witnessed the commencement of the *General Advertiser*, the title of which indicates the purpose to which it was dedicated. This paper was the first successful attempt to depend for support upon the advertisements it contained, thereby creating a new era in the newspaper press. From the very outset its

columns were filled with them, between fifty and sixty, regularly classified and separated by rules, appearing in each publication; in fact, the advertising page put on for the first time a modern look. The departure of ships is constantly notified, and the engravings of these old high-pooped vessels sail in even line down the column. Trading matters have at last got the upper hand. You see "a pair of leather bags," "a scarlet laced-coat," "a sword," still inquired after; and theatres make a show, for this was the dawning of the age of Foote, Macklin, Garrick, and most of the other great players of the last century; but, comparatively speaking, the gaieties and follies of the town ceased gradually from this time to proclaim themselves through the medium of advertisements. The great earthquake at Lisbon so frightened the people, that masquerades were prohibited by law, and the puppet-shows, the rope-dancing, the china-auctions, and public breakfasts henceforth grow scarcer and scarcer as the Ladies Betty and Sally, who inaugurated them, withdrew by degrees, withered, faded, and patched, from the scene.

The only signs of the political tendencies of the time to be gathered from the sources we are pursuing, are the party dinners, announcements of which are now and then to be met with as follows:—

TO THE JOYOUS.—The Bloods are desired to meet together at the house known by the name of the Sir Hugh Middleton, near Saddler's Wells, Islington, which Mr. Skeggs has procured for that day for the better entertainment of those Gentlemen who agreed to meet at his own house. Dinner will be on the Table punctually at two o'clock.—*General Advertiser*, Jan. 13, 1748.

Or the following still more characteristic example from the same paper of April 12:—

HALF-MOON TAVERN, CHEAPSIDE.—Saturday next, the 16 of April, being the anniversary of the Glorious Battle of Colloden, the Stars will assemble in the Moon at Six in the evening. Therefore the Choice Spirits are desired to make their appearance and fill up the joy.—ENDYMION.

Within five-and-twenty years from this dat[redacted] existing morning journals were established, a[redacted]

tising columns put on a guise closely resembling that which they now present. We need not therefore pursue our deep trenching into the old subsoil in order to turn up long-buried evidences of manners and fashions, for they have ceased to appear, either fossil or historical; we therefore boldly leap the gulf that intervenes between these old days and the present.

The early part of the present century saw the commencement of that liberal and systematic plan of advertising which marks the complete era in the art. Princely ideas by degrees took possession of the trading mind as to the value of this new agent in extending their business transactions. Packwood, some thirty years ago, led the way by impressing his razor-strop indelibly on the mind of every bearded member of the empire. Like other great potentates he boasted a laureate in his pay, and every one remembers the reply made to the individuals curious to know who drew up his advertisements: "La, sir, we keeps a poet!"

By universal consent, however, the world has accorded to the late George Robins the palm in this style of commercial puffing. His advertisements were really artistically written. Like Martin, he had the power of investing every landscape and building he touched with an importance and majesty not attainable by meaner hands. He did perhaps go beyond the yielding line of even poetical license, when he described one portion of a paradise he was about to submit to public competition as adorned, among other charms, with a "hanging wood," which the astonished purchaser found out meant nothing more than an old gallows. But then he redeemed slight manœuvres of this kind by touches which really displayed a genius for puffing. On one occasion he had made the beauties of an estate so enchanting, that he found it necessary to blur it by a fault or two, lest it should prove too bright and good "for human nature's daily food." "But there are two drawbacks to the property," sighed out this Hafiz of the Mart, "the litter of the rose-leaves and the noise of the nightingales!" Certainly [illegible]xquisite puffing could no further go, and when he [illegible]ry of advertising departed. Others, such as

Charles Wright of Champagne celebrity, have attempted to strike the strings; and Moses does, we believe, veritably keep a poet; but none of them have been able to rival George the Great, and we yawn as we read sonnets which end in the invariable "mart," or acrostics which refer to Hyam and Co.'s superior vests. Twenty years ago some of the daily newspapers admitted illustrated advertisements into their columns; now it would be fatal to any of them to do so. Nevertheless, they are by far the most effective of their class, as they call in the aid of another sense to express their meaning. All but the minors of the present generation must remember George Cruikshank's exquisite woodcut of the astonished cat viewing herself in the polished Hessian, which made the fortune of Warren. But in those days tradesmen only tried their wings for the flight. It was left to the present time to prove what unlimited confidence in the power of the advertisement will effect, and a short list of the sums *annually* spent in this item by some of the most adventurous dealers will perhaps startle our readers.

"Professor" Holloway, Pills, etc.	£30,000
Moses and Son	10,000
Rowland and Co. (Macassar oil, &c.)	10,000
Dr. De Jongh (cod-liver oil)	10,000
Heal and Sons (bedsteads and bedding)	6,000
Nicholls (tailor)	4,500

It does seem indeed incredible that one house should expend upon the mere advertising of quack pills and ointment a sum equal to the entire revenue of many a German principality. Can it possibly pay? asks the astonished reader. Let the increasing avenue of assistants, to be seen "from morn to dewy eve" wrapping up pills in the "professor's" establishment within the shadow of Temple Bar, supply the answer.* Vastly as the press of this country has expanded of late years, it has proved insufficient to contain within its limits the rapid current of puffing which has set in. Advertisements now overflow into

* A furniture broker made his fortune by an advertisement headed "Advice to Persons about to Marry." Our witty friend [illegible] up this prelude with the single word *Don't*, as the substi[illegible] of four-posted beds.

our omnibuses, our cabs, our railway carriages, and our steamboats. Madame Tussaud pays 90*l.* monthly to the Atlas Omnibus Company alone for the privilege of posting her bills in their vehicles. They are inked upon the pavement, painted in large letters under the arches of the bridges and on every dead wall. Lloyd's weekly newspaper is stamped on the "full Guelph cheek" of the plebeian penny; the emissaries of Moses shower perfect libraries through the windows of the carriages which ply from the railway stations; and, as a crowning fact, Thackeray, in his "Journey from Cornhill to Cairo," tells us that Warren's blacking is painted up over an obliterated inscription to Psammetichus on Pompey's Pillar!

Having shown the reader the slow growth of the advertising column; having climbed, like "Jack in the Bean-stalk," from its humble root in the days of the Commonwealth up its still increasing stem in the succeeding hundred years, we now come upon its worthy flower in the shape of the sixteen-paged *Times* of the present day. Spread open its broad leaves, and behold the greatest marvel of the age—the microcosm in type. Who can recognize in its ample surface, which reflects like some camera-obscura the wants, the wishes, the hopes, and the fears of this great city, the news-book of the Cromwellian times with its leash of advertisements? Herein we see how fierce is the struggle of two millions and a half of people for dear existence. Every advertisement writhes and fights with its neighbour, and every phase of society, brilliant, broken, or dim, is reflected in this battle-field of life. Let us tell off the rank and file of this army of announcements. On the 24th of May, 1855, the *Times*, in its usual sixteen-paged paper, contained the incredible number of 2,575 advertisements. Amazing as this total appears, we only arrive at its full significance by analyzing the vast array. Then, indeed, we feel what an important power is the great British public. Of old the antechambers of the noble were thronged with poets, artists, publicans, tradesmen, and dependants of all kinds, seeking for the smiles of their favour; but what lordly antechamber ever [illegible]ch a crew of place-hunters, servitors, literary and

scientific men, schemers, and shopkeepers as daily offer their services to the humblest individual who can spare a penny for an hour's perusal of the *Times?* Let us take this paper of the 24th of May and examine the crowd of persons and things which cry aloud through its pages, each attempting to make its voice heard above the other. Here we see a noble fleet of ships, 129 in number, chartered for the regions of gold, for America, for India, for Africa—for every port, in fact, where cupidity, duty, or affection holds out an attraction for the British race. Another column wearies the eye with its interminable line of "Wants." Here in long and anxious row we see the modern "mop" or statute-fair for hiring; 429 servants of all grades, from the genteel lady's-maid or the "thorough cook," who will only condescend to accept service where two footmen are kept, to the humble scullery-maid, on that day passed their claims before us for inspection. Another column is noisy with auctioneers; 136 of whom notify their intention of poising their impatient hammers when we have favoured them with our company. Here we see a crowd of booksellers offering, hot from the press, 195 new volumes, many of which, we are assured by the appended critique, "should find a place in every gentleman's library." There are 378 houses, shops, and establishments presented to us to select from; and 144 lodging-house keepers, "ladies having houses larger than they require," and medical men who own "retreats," press forward with genteel offers of board and lodging. Education pursues her claims by the hands of no less than 144 preceptors, male and female; whilst the hair, the skin, the feet, the teeth, and the inward man are offered the kind attention of thirty-six professors who possess infallible remedies for all the ills that flesh is heir to. The remainder is made up of the miscellaneous cries of tradesmen, whose voices rise from every portion of the page like the shouting of chapmen from a fair. In the midst of all this struggle for gold, place, and position, w[illegible] goes on every day in this wonderful publication, ou[illegible] the very depths of the heart, passionate tears, bu[illegible] nation, and heartrending appeals, startle one as t[illegible]

the second column of its front page. Here the father sees his prodigal son afar off and falls upon his neck; the heartbroken mother implores her runaway child to return; or the abandoned wife searches through the world for her mate. It is strange how, when the eye is saturated with the thirst after mammon exhibited by the rest of the broadsheet, the heart becomes touched by these plaintive but searching utterances, a few of which we reproduce :—

THE one-winged Dove must die unless the Crane returns to be a shield against her enemies.—*Times* of 1850.

Or here is another which moves still more :—

B. J. C.—How more than cruel not to write. Take pity on such patient silence.—*Times*, 1850.

The most ghastly advertisement which perhaps ever appeared in a public journal we copy from this paper of the year 1845. It is either a threat to inter a wrong body in the "family vault," or an address to a dead man :—

TO THE PARTY WHO POSTS HIS LETTERS IN PRINCE'S STREET, LEICESTER SQUARE. — Your family is now in a state of excitement unbearable. Your attention is called to an advertisement in Wednesday's *Morning Advertiser*, headed, "A body found drowned at Deptford." After your avowal to your friend as to what you might do, he has been to see the decomposed remains, accompanied by others. The features are gone; but there are marks on the arm; so that, unless they hear from you to-day, it will satisfy them that the remains are those of their misguided relative, and steps will be directly taken to place them in the family vault, as they cannot bear the idea of a pauper's funeral.

Sometimes we see the flashing eyes of indignation gleaming through the very words. The following is evidently written to an old lover with all the burning passion of a woman deceived :—

IT is enough; one man alone upon earth have I found noble. Away from me for ever! Cold heart and mean spirit, you have lost what millions—empires—could not have bought, but which a single word truthfu[illegible]d nobly spoken might have made your own to all eternity. Ye[illegible]forgiven: depart in peace: I rest in my Redeemer.—*Times*,

[illegible] is more confiding love "wafting a sigh from

Indus to the pole," or, finger on lip, speaking secretly, and as he thinks securely, through the medium of cipher advertisements to the loved one. Sweet delusion! There are wicked philosophers abroad who unstring the bow of harder toil by picking your inmost thoughts! Lovers, beware! intriguers tremble! Many a wicked passage of illicit love, many a joy fearfully snatched, which passed through the second column of the first page of the *Times* as a string of disjointed letters, unintelligible as the correspondents thought, to all the world but themselves, have we seen fairly copied out in plain if not always good English in the commonplace books of these cunning men at cryptographs. Here, for instance, we give an episode from the life of "Flo," which appeared in the *Times* of 1853-54, as a proof:—

FLO.—Thou voice of my heart! Berlin, Thursday. I leave next Monday, and shall press you to my heart on Saturday. God bless you!—*Nov.* 29, 1853.

FLO.—The last is wrong. I repeat it. Thou voice of my heart. I am so lonely, I miss you more than ever. I look at your picture every night. I send you an Indian shawl to wear round you while asleep after dinner. It will keep you from harm, and you must fancy my arms are around you. God bless you! how I do love you!—*Dec.* 23, 1853.

FLO.—My own love, I am happy again; it is like awaking from a bad dream. You are, my life; to know that there is a chance of seeing you, to hear from you, to do things to enough. [There is some error here.] I shall try to see you soon. Write to me as often as you can. God bless you, thou voice of my heart!—*Jan.* 2, 1854.

FLO.—Thou voice of my heart! How I do love you! How are you? Shall you be laid up this spring? I can see you walking with your darling. What would I give to be with you! Thanks for your last letter. I fear nothing but separation from you. You are my world, my life, my hope. Thou more than life, farewell! God bless you!—*Jan.* 6, 1854.

FLO.—I fear, dearest, our cipher is discovered: write at once to your friend "Indian Shawl" (P.O.), Buckingham, Bucks.—*Jan.* 7, 1845.

The advertisement of January 7th is written in a great fright, and refers to the discovery and exposure of the ci[redacted] the *Times* newspaper; for whenever the aforesaid perceive that a secret correspondence has arri[redacted]

point they charitably insert a marplot advertisement in the same cipher. The "Flo" intrigue was carried on in figures, the key to which is as follows :—

0	1	2	3	4	5	6	7	8	9
y.	u.	o.	i.	e.	a.	d.	k.	h.	f.
s.	t.	n.	m.	r.	l.	d.	g.	w.	p.
x.							c.	b.	
								v.	

The reader will perhaps remember another mad-looking advertisement which appeared in the year 1853, headed "Cenerentola." The first, dated Feb. 2nd, we interpret thus :—

CENERENTOLA, I wish to try if you can read this, and am most anxious to hear the end, when you return, and how long you remain here. Do write a few lines, darling, please : I have been very far from happy since you went away.

One of the parties cannot frame an adequate explanation of some delicate matter clearly, as we find on the 11th the following :—

CENERENTOLA, until my heart is sick have I tried to frame an explanation for you, but cannot. Silence is safest, if the true cause is not suspected ; if it is, all stories will be sifted to the bottom. Do you remember our cousin's first proposition?—think of it.

The following, which appeared on the 19th of the same month, is written in plain language, and is evidently a specimen of the marplot advertisement before alluded to :—

CENERENTOLA, what nonsense ! Your cousin's proposition is absurd. I have given an explanation—the true one—which has perfectly satisfied both parties—a thing which silence never could have effected. So no more such absurdity.

The secret of this cipher consisted in representing each letter by the twenty-second onward continually. One more specimen of these singular advertisements and we have done. On Feb. 20, 1852, there appeared in the *Times* the following mysterious line :—

[redacted]t tig jfhiirvola og tig psgvw.—F. D. N.

reader, doubtless, looked upon this jumble of

letters with some such a puzzled air as the mastiff gives the tortoise in a very popular French bronze; but not being able to make anything out of it, passed on to the more intelligible contents of the paper. A friend of ours, however, was curious and intelligent enough to extract the plain English out of it, though not without much trouble, as thus:—If we take the first word of the sentence, Tig, and place under its second letter i the one which alphabetically precedes it, and treat the next letters in a similar manner, we shall have the following combination:—

T i g
h f
e

Reading the first letters obliquely we have the article "The;" if we treat the second word in the same manner, the following will be the result:—

T	j	o	h	w
	i.	n.	g.	v.
		m.	f.	u.
			e.	t.
				s.

which, read in the same slanting way, produces the word *Times*, and the whole sentence, thus ingeniously worked out, gives up its latent and extraordinary meaning, thus—

"THE *Times* is the Jefferies of the press."

What could have induced any one to take so much trouble thus to plant a hidden insult into the leading journal, we cannot divine. "East, "He Blew," "Willie and Fanny," "Dominoes," and "My darling A.," need not feel uncomfortable although we know their secrets. We have said quite enough to prove to these individuals that such ciphers as they use, are picked immediately by any cryptographic Hobbs; indeed, all systems of writing which depend upon transmutations of the letters of the alphabet, or the substitution of figures for le[illegible] such [illegible] we generally find in the *Times*, are mere puzzl[illegible] and not worthy of the more cunning or finished[illegible]

It is not to be expected, with all the caution exhibited by the morning papers to prevent the insertion of swindling advertisements that rogues do not now and then manage to take advantage of their great circulation for the sake of forwarding their own nefarious schemes. Sir Robert Carden has just done good service by running to earth the Mr. Fynn, who for years has lived abroad in splendour at the expense of the poor governesses he managed to victimize through the advertising columns of the *Times*. One's heart sickens at the stream of poor young ladies his promises have dragged across the continent, and the consequences which may have resulted from their thus putting their reputation as well as their money into his power. Such scandalous traps as these are, of course, rare; but the papers are full of minor pitfalls, into which the unwary are continually falling, sometimes with their eyes wide open. Of the latter class are the matrimonial advertisements; here is a specimen of one of the most artful of its kind we ever remember to have seen:—

TO GIRLS OF FORTUNE—MATRIMONY.—A bachelor, young, amiable, handsome, and of good family, and accustomed to move in the highest sphere of society, is embarrassed in his circumstances. Marriage is his only hope of extrication. This advertisement is inserted by one of his friends. Ingratitude was never one of his faults, and he will study for the remainder of his life to prove his estimation of the confidence placed in him.—Address, post-paid, L. L. H. L., 47, King Street, Soho.—N.B. The witticisms of cockney scribblers deprecated.

The air of candour, and the taking portrait of the handsome bachelor, whose very poverty is converted into a charm, is cleverly assumed. An announcement of a much less flattering kind, but probably of a more genuine and honourable nature, was published in *Blackwood* some time ago, which we append, as, like Landseer's dog-pictures, the two form a capital pair illustrative of high and low life.

MATRIMONIAL ADVERTISEMENT.—I hereby give notice to all unmarried women, that I, John Hobnail, am at this writing fi[illegible]d-forty, a widower, and in want of a wife. As I wish [illegible]istaken, I have a good cottage, with a couple of acres [illegible]h I pay 2*l.* a year. I have five children, four of them old [illegible]mployment; three sides of bacon, and some pigs ready

for market. I should like to have a woman fit to take care of her house when I am out. I want no second family. She may be between forty and fifty if she likes. A good sterling woman would be preferred, who would take care of the pigs.

The following is also matter of fact, but it looks supicious:—

MATRIMONY TO MILLINERS AND DRESSMAKERS. A young man about to EMIGRATE to SOUTH AUSTRALIA would be happy to form an alliance with a young woman in the above line possessing 60*l.* or 100*l.* property. Any one so disposed, by applying by letter (post-paid) to T. Hall, 175, Upper Thames Street, till Saturday next, appointing an interview, may depend on prompt attention and strict secrecy.—*Times*, 1845.

The matrimonial bait is so obviously a good one, that of late years we see advertisements of institutions, at which regular lists of candidates for the marriage state, both male and female, are kept, together with portraits, and a ledger in which pecuniary and mental qualifications are neatly posted. Such springes are only suited, however, for the grossest folly; but there is another class of advertisements which empties the pockets of the industrious and aspiring in a very workmanlike manner: we allude to such as the following:—

GENTLEMEN having a respectable circle of acquaintance may hear of means of INCREASING their INCOME without the slightest pecuniary risk, or of having (by any chance) their feelings wounded. Apply for particulars, by letter, stating their position, &c., to W. R., 37, Wigmore Street, Cavendish Square.

Gentlemen whose feelings are so delicate that they must not be injured on any consideration, who nevertheless have a desire for lucre, we recommend not to apply to such persons, unless they wish to receive for their pains some such a scheme as was forwarded to a person who had answered an advertisement (enclosing, as directed, thirty postage-stamps) in *Lloyd's Weekly Journal*, headed "How to make 2*l.* per week by the outlay of 10*s.*":—

"First purchase 1 cwt. of large-sized potatoes, which may be obtained for the sum of 4*s.*, then purchase a large basket, which will cost say another 4*s.*, then buy 2*s.* worth of flannel blanketing, and [redacted] will comprise your stock in trade, of which the total cost is 10*s.* [redacted] potato weighs about half a pound, consequently there are [redacted] a cwt.

"Take half the above quantity of potatoes each evening to a baker's, and have them baked; when properly cooked put them in your basket, well wrapped up in the flannel to keep them hot, and sally forth and offer them for sale at one penny each. Numbers will be glad to purchase them at that price, and you will for certain be able to sell half a cwt. every evening. From the calculation made below you will see by that means you will be able to earn 2*l.* per week. The best plan is to frequent the most crowded thoroughfares, and make good use of your lungs; thus letting people know what you have for sale. You could also call in at each public-house on your way, and solicit the patronage of the customers, many of whom would be certain to buy of you. Should you have too much pride to transact the business yourself (though no one need be ashamed of pursuing an honest calling), you could hire a boy for a few shillings a week, who could do the work for you, and you could still make a handsome profit weekly.

"The following calculation proves that 2*l.* per week can be made by selling baked potatoes:—

"1 cwt., containing 224 potatoes, sold in two evenings, at 1*d.* each	£0	18	8
Deduct cost	0	4	0
	£0	14	8
			3
Six evenings' sale	£2	4	0
Pay baker at the rate of 8*d.* per evening for baking potatoes	0	4	0
Net profit per week	£2	0	0"

One more specimen of these baits for gudgeon, and we have done. We frequently see appeals to the benevolent for the loans of small sums. Some of these are doubtless written by innocent persons in distress, who confide in the good side of human nature; and we have been given to understand that in many cases this blind confidence has not been misplaced; for there are many Samaritans who read the papers nowadays, and feel a romantic pleasure in answering such appeals: at the same time, we are afraid that the great majority of them are gross deceptions. The veritable whine of "the poor broken-down tradesman" who makes a habit of visiting our quiet streets and appealing, in a very solemn voice, to "my brethren" for the loan of a small trifle, whilst he anxiously scans the windows for the halfpence, is observable, for instance, in the following cool appeal:—

"TO THE BENEVOLENT.—A Young Tradesman has, from [redacted] of misfortunes, been reduced to the painful necessity of asking [redacted]UM to enable him to raise 10*l.* to save himself from inevit-

able ruin and poverty; or if any gentleman would lend the above it would be faithfully repaid. Satisfactory references as to the genuineness of this case.—Direct to A. Z., Mr. Rigby's, Post-Office, Mile-end Road.

The receipt of conscience-money is constantly acknowledged in advertisements by the Chancellor of the Exchequer of the day, and the sums which in this manner find their way into the Exchequer are by no means inconsiderable. It is honourable to human nature, amid all the roguery we have exposed, to find that now and then some conscience is touched by a very small matter, and that great trouble and no little expense is often gone to in order that others may not suffer through the inadvertency or carelessness of the advertiser. The following is a delicate example:—

TO HACKNEY-COACHMEN.—About the month of March last, a gentleman from the country took a coach from Finsbury Square, and accidentally broke the glass of one of its windows. Being unwell at the time, the circumstance was forgotten when he quitted the coach, and it would now be a great relief to his mind to be put in a situation to pay the coachman for it. Should this meet the eye of the person who drove the coach, and he will make application to A. B., at Walker's Hotel, Dean Street, Soho, any morning during the next week, before eleven o'clock, proper attention will be paid to it.—*Times*, 1842.

The more curious advertisements which from time to time appear in the public journals, but particularly in the *Times*, do not admit of classification; and they are so numerous, moreover, that if we were to comment upon one tithe of those that have appeared within the last six years, we should far exceed the limits of this article. We make no apology, therefore, for stringing together the following very odd lot:—

DO YOU WANT A SERVANT?—Necessity prompts the question.—The advertiser OFFERS his SERVICES to any lady or gentleman, company, or others, in want of a truly faithful confidential servant in any capacity not menial, where a practical knowledge of human nature, in various parts of the world, would be available. Could undertake any affair of small or great importance, where talent, inviolable secrecy, or good address would be necessary. Has moved in the best and worst societies without being contaminated by either; has never been a servant; begs to recommend himself as one who knows his place; is moral, temperate, middle-aged; no objection to any part of the world. Could advise any capitalist wishing to increase his income, and have the co[illegible] his own money. Could act as secretary or valet to any lady o[illegible] Can give advice or hold his tongue, sing, dance, play, fenc[illegible]

a sermon, tell a story, be grave or gay, ridiculous or sublime, or do anything, from the curling of a peruke to the storming of a citadel, but never to excel his master.—Address, A. B. C., 7, Little St. Andrew Street, Leicester Square.—*Times*, 1850.

THE MIGHTY ANGEL'S MIDNIGHT ROAR.—"Behold the Bridegroom cometh, go ye out to meet him." This awful cry, as is demonstrated, will very shortly be heard, viz.: at the commencement of "the great day (or year) of God's wrath," or the last of the 2,300 days (or years) in Daniel's prophecy. By the authors of "Proofs of the Second Coming of Messiah at the Passover in 1848." Price 6*d*. Fourth Edition.

This is a Muggletonian prophecy of the destruction of the world at a certain date. The prediction failed, however, and the prophet found it necessary to explain the reason :—

THE MIGHTY ANGEL'S MIDNIGHT ROAR.—The authors, owing to their disappointment, most sedulously investigated its cause, and instantly announce its discovery. Daniel's vision, in chap. 8, was for 2,300 years, to the end of which (see 5-12) the "little horn" was to practise and prosper, after which comes the year of God's wrath, which was erroneously included in the 2,300 years, and thus the midnight cry will be a year later than stated.—*Times*, 1851.

TO P. Q. HOW IS YOUR MOTHER? I shan't inquire further, and must decline entering upon the collateral branches of the family.—*Times*, 1842.

TO WIDOWERS and SINGLE GENTLEMEN.—WANTED, by a lady, a SITUATION to superintend the household and preside at table. She is agreeable, becoming, careful, desirable, English, facetious, generous, honest, industrious, judicious, keen, lively, merry, natty, obedient, philosophic, quiet, regular, sociable, tasteful, useful, vivacious, womanish, xantippish, youthful, zealous, &c.—Address, X. Y. Z., Simmond's Library, Edgeware Road.—*Times*.

THE TITLE OF AN ANCIENT BARON. Mr. George Robins is empowered to SELL the TITLE and DIGNITY of a BARON. The origin of the family, its ancient descent, and illustrious ancestry, will be fully developed to those and such only as desire to possess this distinguished rank for the inconsiderable sum of 1,000*l*. Covent-garden Market.—*Times*, 1841.

POSTAGE STAMPS. A young lady, being desirous of covering her dressing-room with cancelled POSTAGE STAMPS, has been so far encouraged in her wish by private friends as to have succeeded in collecting 16,000! these, however, being insufficient, she will be [redacted]tly obliged if any good-natured persons who may have these (otherwise [redacted]) little articles at their disposal would assist in her whimsical project. [redacted]E. D., Mr. Butt's, glover, Leadenhall Street; or Mr. Marshall's, [redacted]ney.—*Times*, 1841.

TO THE THEATRICAL PROFESSION.—WANTED, for a Summer Theatre and Circuit, a Leading Lady, Singing Chambermaid, First Low Comedian, Heavy Man, Walking Gentleman, and one or two Gentlemen for Utility. To open July 9th.

Address (enclosing Stamp for reply) to Mr. J. WINDSOR, Theatre Royal, Preston, Lancashire.—*Era*, July 1, 1855.

WANTED a Man and his Wife to look after a Horse and Dairy with a religious turn of mind without any incumbrance.

The variety is perhaps as astonishing as the number of advertisements in the *Times*. Like the trunk of an elephant, no matter seems too minute or too gigantic, too ludicrous or too sad, to be lifted into notoriety by the giant of Printing-house Square. The partition of a thin rule suffices to separate a call for the loan of millions from the sad weak cry of the destitute gentlewoman to be allowed to slave in a nursery "for the sake of a home." Vehement love sends its voice imploring through the world after a graceless boy, side by side with the announcement of the landing of a cargo of lively turtle, or the card of a bug-killer. The poor lady who advertises for boarders "merely for the sake of society" finds her "want" cheek-by-jowl with some Muggletonian announcement gratuitously calculated to break up society altogether, to the effect that the world will come to an end by the middle of the next month. Or the reader is informed that for twelve postage stamps he may learn "How to obtain a certain fortune," exactly opposite an offer of a bonus of 500*l.* to any one who will obtain for the advertiser "a Government situation." The *Times* reflects every want, and appeals to every motive which affects our composite society. And why does it do this? Because of its ubiquity: go where we will, there, like the house-fly or the sparrow, we find it. The porter reads it in his beehive-chair, the master in his library; Green, we have no doubt, takes it with him to the clouds in his balloon, and the collier reads it in the depths of the mine; the workman at his bench, the lodger in his two-pair back, the gold-digger in his hole, and the soldier in the trench, pore over its broad pages. Hot from the press, or months old, still it is read. That it is, *par excellence*, the nation[illegible] and reflects more than any other the life of the pe[illegible]

gathered from its circulation. They show in the editor's room a singular diagram, which indicates by an irregular line the circulation day by day and year by year. On this sheet the gusts of political feeling and the pressure of popular excitement are as minutely indicated as the force and direction of the wind are shown by the self-registering apparatus in Lloyd's Rooms. Thus we find that in the year 1845 it ran along at a pretty nearly dead level of 23,000 copies daily. In 1846—for one day, the 28th of January, that on which the report of Sir Robert Peel's statement respecting the Corn Laws appeared—it rose in a towering peak to a height of 51,000, and then fell again to its old number. It began the year 1848 with 29,000, and rose to 43,000 on the 29th of February—the morrow of the French revolution. In 1852 its level at starting was 36,000, and it attained to the highest point it has yet touched on the 19th of November, the day of the Memoir of the Great Duke, when 69,000 copies were sold. In January, 1853, the level had arisen to 40,000; and at the commencement of the present year it stood at 58,000, a circulation which has since increased to 60,000 copies daily! Notwithstanding all the disturbing causes which make the line of its circulation present the appearance of hill and dale, sometimes rising into Alp-like elevations, its ordinary level at the beginning of each year for some time past has constantly gone on advancing; insomuch that within ten years its circulation has more than doubled by 7,000 daily.

This vigorous growth is the true cause of that wonderful determination of advertisements to its pages, which have overflowed into a second paper, or supplement, as it was formerly called. That this success has been fairly won, we have never ourselves doubted; but a fact has come to our knowledge which will pretty clearly prove that this great paper is conducted on principles which are superior to mere money considerations; or rather its operations are so large that it can afford to inflict upon itself pecuniary losses, such as would annihilate any other [redacted] in order to take a perfectly free course. In the year [redacted] the railway mania was at its height, the *Times*

advertising sheet was overrun with projected lines, and many a guess was made, we remember, at the time as to their probable value; but high as the estimates generally were, they came far short of the truth. We give the cash and credit returns of advertisements of all kinds for nine weeks:—

Sept. 6	£2839 14 0
„ 13	3783 12 0
„ 20	3935 7 6
„ 27	4692 7 0
Oct. 4	6318 14 0
„ 11	6543 17 0
„ 18	6687 4 0
„ 25	6025 14 6
Nov. 1	8230 3 6

During the greater part of the time that the proprietors were reaping this splendid harvest from the infatuation of the people, the heaviest guns were daily brought to bear from the leading columns upon the bubbles which rose up so thickly in the advertising sheet. The effect of their fire may be measured by the falling off of nearly 3,000*l.* in the returns for a single week. A journal which could afford to sacrifice such a revenue to its independence, certainly deserved some consideration from the Government; but, on the contrary, it appears to have been singled out for annoyance by the act which relates to newspapers. We see certain trees on our lawns whose upshooting branches are by ingenious gardeners trained downwards, and taught to hold themselves in a dependent condition by the imposition of weights upon their extremities. The state gardeners have applied the same treatment to the journal in question, by hanging an extra halfpenny stamp upon every copy of its issue—a proceeding which, in our opinion, is as unfair as it is injudicious: and this they will find in the future, when the crowd of mosquito-like cheap journals called forth by the measure, and supported by the very life-blood of the leading journal, begin to gather strength and to attack Whiggery with their democratic buzz.

We have dwelt chiefly upon the advertising sheet of the *Times*, because it is the epitome of that in all the other [illegible] It must be mentioned, however, that some of th[illegible]

weekly papers lay themselves out for class advertisements. Thus the *Morning Post* monopolizes all those which relate to fashion and high life; and the *Morning Advertiser*, the paper of the licensed victuallers, aggregates to itself every announcement relating to their craft. *Bell's Life* is one mass of advertisements of various sports; the *Era* is great upon all theatricals; the *Athenæum* gathers to itself a large proportion of book advertisements. The *Illustrated News* among the weeklies, like the *Times* among the dailies, towers by the head above them all. A hebdomadal circulation of 170,000 draws a far more cosmopolitan collection of announcements to its pages than any of its contemporaries can boast. We have said nothing of the advertisements in the provincial journals; but it is gratifying to find that they have more than kept pace with those which have appeared in the metropolitan papers. Their enormous increase is best shown by the returns of the advertisement duty; from which it appears that in 1851 no less than 2,334,593 advertisements were published in the journals of Great Britain and Ireland—a number which has vastly augmented since the tax upon them has been repealed.

It is curious to see the estimate which the different journals place upon themselves as mediums of publicity, by comparing their charges for the same advertisement. Thus the contents of the *Quarterly Review* for January, 1855, precisely similar as far as length is concerned, was charged for insertion as an advertisement by the different papers as follows:—*Times*, 4s.; *Illustrated News*, 1*l.* 8s.; *Morning Chronicle*, 5s. 6d.; *Morning Post*, 6s.; *Daily News*, 5s. 6d.; *Spectator*, 7s. 6d.; *Morning Herald*, 6s.; *Punch*, 15s.; *Observer*, 9s. 6d.; *English Churchman*, 5s. 6d.; *Examiner*, 3s. 6d.; *John Bull*, 5s. 6d.; *Athenæum*, 10s. 6d. Now the *Times* did not "display" the advertisement as all the others did, it is true, and therefore squeezed it into half the space; but with this difference, its charge was absolutely the lowest in the list, with the single exception of that of the *Examiner*. How this moderation on the part of the Leading Journal is to be accounted for we know not; but the apparent dearness of the *Illustrated News* meets a ready solution, and

affords us an opportunity of showing how vastly the prime cost of an advertisement, during the present high price of paper especially, is augmented by a great increase of the circulation of the paper in which it appears, and what the advertiser really gets for his money. If we take the advertisement of our contents (*Quarterly Review*), it will be found to measure about one inch in depth; it is obvious, then, that we must multiply this measure by 170,000, the number of separate copies in which it appeared. Now 170,000 inches yield a strip of printed paper the width of a newspaper column—*upwards of two miles and three-quarters long!* Thus we have at a glance the real amount of publicity which is procurable in a great journal; and with so remarkable a statement it will be well to close our paper.

FOOD AND ITS ADULTERATIONS.

A STORY is told of a European who, wishing to convince a Brahmin of the folly of his faith in interdicting, as an article of food, anything that once possessed life, showed him, by the aid of the microscope, that the very water which he drank was full of living things. The Indian, thus suddenly introduced to an unseen world, dashed the instrument to the ground, and reproached his teacher for having so wantonly destroyed the guiding principle of his life. We, too, have at home a Hindoo, in the shape of the believing British public, to whose eye Dr. Hassall nicely adjusts the focus of his microscope, and bids him behold what unseen villanies are daily perpetrated upon his purse and person.

The world at large has almost forgotten Accum's celebrated work, "Death in the Pot;" a new generation has indeed sprung up since it was written, and fraudulent tradesmen and manufacturers have gone on in silence, and, up to this time, in security, falsifying the food and picking the pockets of the people. Startling indeed as were the revelations in that remarkable book, yet it had little effect in reforming the abuses it exposed. General denunciations of grocers did not touch individuals of the craft, and they were consequently not driven to improve the quality of their wares. The *Lancet* Commission went to work in a different manner. In Turkey, when of old they caught a baker giving false weight, or adulterating the staff of life, they nailed his ear to the door-post, "pour encourager les autres." Dr. Hassall, like a modern Al Raschid, perambulated the town himself, or sent his trustworthy agents to pur-

chase articles, upon all of which the inexorable microscope was set to work, and every fraudulent sample, after due notice given, subjected its vendor to be pinned for ever to the terrible pages of the Commissioners' report. In this manner direct responsibility was obtained. If the falsification denounced was not the work of the retailer, he was glad enough to shift the blame upon the manufacturer; and thus the truth came out.

A gun suddenly fired into a rookery could not cause a greater commotion than this publication of the names of dishonest tradesmen; nor does the daylight, when you lift a stone, startle ugly and loathsome things more quickly than the pencil of light, streaming through a quarter-inch lens, surprised in their naked ugliness the thousand and one illegal substances which enter more or less into every description of food that it will pay to adulterate. Nay, to such a pitch of refinement has the art of falsification of alimentary substances reached, that the very articles used to adulterate are adulterated; and while one tradesman is picking the pockets of his customers, a still more cunning rogue is, unknown to himself, deep in his own!

The manner in which food is adulterated is not only one of degree, but of kind. The most simple of all sophistications, and that which is most harmless, is the mixture of inferior qualities of the same substance. Indeed, if the price charged were according to quality, it would be no fraud at all; but this adjustment rarely takes place. Secondly, the mixture of cheaper articles of another kind. Thirdly, the surreptitious introduction of materials which, taken in large quantities, are prejudicial to health; and, fourthly, the admixture of the most deadly poisons in order to improve the appearance of the article "doctored."

The microscope alone is capable of detecting at one operation the nature and extent of the more harmless but general of these frauds. When once the investigator, by the aid of that instrument, has become familiar with the configurations of different kinds of the same chemically composed substances, he is armed with far greater detective power than chemical agents

could provide him with. It is beyond the limit of the test-tube to show the mind the various forms of animal and vegetable life which exist in impure water; delicate as are its powers, it could not indicate the presence of the sugar-insect, or distinguish with unerring nicety an admixture of the common Cireuma arrowroot with the finer Maranta. Chemistry is quite capable of telling the component parts of any article: what are the definite forms and natures of the various ingredients which enter into a mixture, it cannot so easily answer. This the microscope can at once effect; and in its present application consists Dr. Hassall's advantage over all previous investigators in the same field. The precision with which he is enabled to state the result of his labours leaves no appeal: he shows his reader the intimate structures of a coffee-grain, and of oak or mahogany sawdust; and then a specimen of the two combined, sold under the title of genuine Mocha. Many manufacturers and retailers who have been detected falsifying the food of the public, have threatened actions; but they all flinched from the test of this unerring instrument.

The system of adulteration is so wide-spread, and embraces so many of the items of the daily meal, that we scarcely know where to begin—what corner of the veil first to lift. Let us hold up the cruet-frame, for example, and analyze its contents. There is mustard, pepper (black and cayenne), vinegar, anchovy and Harvey sauce—so thinks the unsuspecting reader; let us show him what else beside. To begin with mustard. "Best Durham," or "Superfine Durham," no doubt it was purchased for; but we will summarily dismiss this substance by stating that it is impossible to procure it pure at all: out of forty-two samples bought by Dr. Hassall at the best as well as inferior shops, all were more or less adulterated with wheaten flour for bulk, and with turmeric for colour. Vinegar also suffers a double adulteration. It is first watered, and then pungency is given to it by the addition of sulphuric acid. A small quantity of this acid is allowed by law; and this is frequently trebled by the victuallers. The pepper-castor is another stronghold of fraud—fraud so long and openly practised, that we

question if the great mass of the perpetrators even think they are doing wrong. Among the milder forms of sophistication to which this article is subjected, are to be found such ingredients as wheaten flour, ground rice, ground mustard-seeds, and linseed-meal. The grocer maintains a certain reserve as to the generality of the articles he employs in vitiating his wares; but pepper he seems to think is given up to him by the public to "cook" in any manner he thinks fit. This he almost invariably does by the addition of what is known in the trade as P. D., or pepper-dust, *alias* the sweepings from the pepper warehouses. But there is a lower depth still: P. D. is too genuine a commodity for some markets, and it is accordingly mixed with D. P. D., or dirt of pepper-dust.

A little book, published not long since, entitled "The Successful Merchant," which gives the minute trade history of a gentleman very much respected in Bristol, Samuel Budgett, Esq., affords us a passage bearing upon this P. D. which is worthy of notice.

"In Mr. Budgett's early days," says his biographer, "pepper was under a heavy tax, and in the trade universal tradition said that out of the trade everybody expected pepper to be mixed. In the shop stood a cask labelled P. D., containing something *very like* pepper-dust, wherewith it was usual to mix the pepper before sending it forth to serve the public. The trade tradition had obtained for the apocryphal P. D. a place amongst the standard articles of the shop, and on the strength of that tradition it was vended for pepper by men who thought they were honest. But as Samuel went on in life, his ideas on trade morality grew clearer; this P. D. began to give him much discomfort. He thought upon it till he was satisfied that, after all that could be said, the thing was wrong: arrived at this conclusion, he felt that no blessing could light upon the place while it was there. He instantly decreed that P. D. should perish. It was night; but back he went to the shop, took the hypocritical cask, carried it out to the quarry, then staved it, and scattered P. D. among the clods and slag and stones."

Would we could say that the reduction of the tax upon pepper had stimulated the honesty of other grocers to act a similar part to that of Mr. Budgett; but P. D. flourishes as flagrantly as ever; and if every possessor of the article in London were to stave his casks in the roadway, as conscientiously as did the "Successful Merchant," there would be hard work for the scavengers. In the days of Accum it was usual to manufacture peppercorns

out of oiled linseed-cake, clay, and cayenne-pepper, formed into a mass, and then granulated: these fraudulent corns were mixed with the real to the extent of seventeen per cent. This form of imposition, like that of wooden nutmegs among our American friends, has, we are happy to say, long been abandoned. The adulterations we have mentioned are simply dirty and fraudulent; but in the cayenne-cruet we find, in addition, a deadly poison. Out of twenty-eight samples submitted to examination, no less than twenty-four were adulterated with white mustard-seed, brickdust, salt, ground rice, and *deal sawdust*, by way of giving bulk; but as all of these tend to lighten the colour, it is necessary to heighten it to the required pitch. And what is employed to do this? Hear and tremble, old Indians and lovers of high-seasoned food—with RED LEAD. Out of twenty-eight samples, red lead, and *often in poisonous quantities*, was present in thirteen! Who knows how many "yellow admirals" at Bath have fallen victims to their cayenne-cruets? Nor can it be said that the small quantity taken at a time could do no permanent mischief; for lead belongs to the class of poisons which are cumulative in their effects.

He who loves cayenne, as a rule is fond of curry-powder; and here also the poisonous oxide is to be found in large quantities. Some years ago, a certain amiable duke recommended the labouring population, during a season of famine, to take a pinch of this condiment every morning before going to work, as "warm and comforting to the stomach." If they had followed his advice, thirteen out of every twenty-eight persons would have imbibed a slow poison. Those who are in the habit of using curry, generally take it in considerable quantities, and thus the villanous falsification plays a more deadly part than even in cayenne-pepper. Imagine a man for years pertinaciously painting his stomach with red lead! We do not know whether medical statistics prove that paralysis prevails much among "Nabobs;" but of this we may be sure, that there could be no more fruitful source of it than the two favourite stimulants we have named.

The great staple articles of food are not subject to adul-

teration in the same proportion as many other articles of minor demand. We need scarcely say that meat is exempt so long as it remains in the condition of joints; but immediately it is prepared in any shape in which its original fibre and form can be hidden, the spirit of craft begins to work. The public have always had certain prejudices against sausages and polonies, for example; and, if we are to believe a witness examined on oath before the Smithfield Market Commissioners in 1850, not without reason. It is a very old joke that there are no live donkeys to be found within twenty miles of Epping; but if all the asinine tribe in England were to fall victims to the chopping-machine, we question if they could supply the *à-la-mode*, polony, and sausage establishments. Mr. J. Harper, for instance, being under examination, upon being asked what became of the diseased meat brought into London, replied:—

"It is purchased by the soup-shops, sausage-makers, the *à-la-mode* beef and meat-pie shops, &c. There is one soup-shop, I believe, doing five hundred pounds per week in diseased meat. This firm has a large *foreign* trade [thank goodness!]. The trade in diseased meat is very alarming, as anything in the shape of flesh can be sold at about one penny per pound, or eightpence per stone. . . . . I am certain that if one hundred carcases of cows were lying dead in the neighbourhood of London, I could get them all sold within twenty-four hours: *it don't matter what they died of.*"

It must not be imagined that the *à-la-mode* beef interest is supplied with this carrion by needy men, whose necessities may in some degree palliate their evil dealings. In proof of this we quote further from Mr. Harper's evidence. In answer to the question, "Is there any slaughtering of bad meat in the country for the supply of the London market?" he says,—

"The London market is very extensively supplied with diseased meat from the country. There are three insurance offices in London in which graziers can insure their beasts from disease. It was the practice of one of these offices to send the unsound animals dying from disease to their own slaughter-houses, situate a hundred and sixty miles from London, to be dressed and sent to the London market. . . . . Cattle, sheep, &c., are insured against all kinds of diseases; and one of the conditions is, that the diseased animal, when dead, becomes the property of the insurance company, the party insuring receiving two-thirds of the value of the animal and one-third of the salvage; or, in other words, one-third of the amount the beast is sold for when dead."

Upon being asked, "Do you believe it is still the habit of this company to send up the diseased animals to London?" he replied,—

"Yes, I do; until lately they were regularly consigned to a meat-salesman in Newgate market of the name of Mathews. . . . . The larger quantities are sold to people who manufacture it into soup, meat-pies, sausages, &c."

We have no wish to destroy the generally robust appetite of the persons who visit such shops by any gratuitous disclosure; but we question whether the most hungry crossing-sweeper would look any more with a longing eye upon the huge German sausages, rich and inviting as they appear, if, like Mr. Harper, he knew the too probable antecedents of their contents. The only other preparations of flesh open to adulteration are preserved meats. Some years ago, "the Goldner canister business" so excited the public against this invaluable method of storing perishing articles of food, that a prejudice has existed against it ever since; and a more senseless prejudice could not be. Goldner's process, since adopted by Messrs. Cooper and Aves, is simple and beautiful. The provisions, being placed in tin canisters having their covers soldered down, are plunged up to their necks in a bath of chloride of calcium (a preparation which imbibes a great heat without boiling), and their contents are speedily cooked; at the same time all the air in the meat, and some of the water, are expelled in the form of steam, which issues from a pin-hole in the lid. The instant the cook ascertains the process to be complete, he drops a plug of solder upon the hole, and the mass is thus hermetically sealed. Exclusion of air, and coagulation of the albumen, are the two conditions which enable us to hand the most delicate-flavoured meats down to remote generations,—for as long, in fact, as a stout painted tin canister can maintain itself intact against the oxidating effect of the atmosphere. We have ourselves partaken lately of a duck that was winged, and of milk that came from the cow, as long as eight years ago. Fruit which had been gathered whilst the free-trade struggle was still going on, we found as delicate in flavour as though it had just been plucked

from the branch. Out of the many cases of all kinds of provisions opened and examined by Dr. Hassall, scarcely any have been found to be bad. When we remember that the graves of so many of our soldiers in the Crimea may be justly inscribed, "Died of salt pork," we cannot forbear to call attention to a neglected means of feeding our troops with good and nutritious food, instead of with the tough fibre called meat, from which half the blood-making qualities have been extracted by the process of boiling, whilst the remaining half is rendered indigestible by the action of salt, and poisonous by the extraction of one of its most important constituents. It would seem as if we were living in the days of Anson, who lost 626 men of scurvy, out of a crew of 961, before he could reach the island of Juan Fernandez, or of the still later cruise of Sir C. Hardy, who sent 3,500 to hospital with this fatal disease, after a six weeks' sail with the Channel fleet. It may be urged that the sailors in the late war did not sicken on salt pork; but while they had the necessary amount of potass, which the stomach requires to make blood, in the lime-juice served out to them, our troops were without this indispensable accompaniment, and consequently died. In the preserved meats, which are made up with potatoes and other vegetables, the needful potass exists, and such food may be purchased as cheaply as the pernicious salt junk which is patronized by the Government.

Bread, the great blood-producer, claims particular attention. It often surprises persons who walk about the metropolis to find that prices vary according to the locality; thus the loaf that costs in the Borough or the New Cut 7*d.* a quartern, is 10½*d.* at the West End. Can plate-glass windows and rent cause all this difference? Certainly not. We are glad, however, to find that many of the adulterations mentioned by our older writers have vanished with free trade. Prince and Accum mention plaster of Paris, bone-dust, the meal of other cereal grains, white clay, alum, sulphate of copper, potatoes, &c. All of these sophistications have disappeared, with the exception of potatoes, which are occasionally employed when the difference between their value and that of flour makes it worth while for the baker or miller

to introduce them. When we see a loaf marked under the market price, we may rest assured that it is made of flour ground from inferior and damaged wheat. In order to bring this up to the required colour, and to destroy the sour taste which often belongs to it, bakers are in the habit of introducing a mixture called in the trade "hards" and "stuff," which is nothing more than alum and salt, kept prepared in large quantities by the druggists. The quantity of alum necessary to render bread white is certainly not great—Mitchell found that it ranged from 116 grains to 34½ grains in the four-pound loaf; but the great advantage the baker derives from it, in addition to improving the colour of his wares, is, that it absorbs a large quantity of water, which he sells at the present time at the rate of 2*d.* a pound. Out of twenty-eight loaves of bread bought in every quarter of the metropolis, Dr. Hassall did not find one free from the adulteration of alum; and in some of the samples he found considerable quantities. As a general rule, the lower the neighbourhood, the cheaper the bread, and the greater the quantity of this "hards" or "stuff" introduced. We must not, however, lay all the blame upon the baker. This was satisfactorily shown by the Sanitary Commissioners, when dealing with the bread sold by the League Bread Company, whose advertisement to the following effect is constantly to be seen in the *Times*:—

"The object for which the above company was established, and is now in operation, is to insure to the public bread of a pure and nutritious character. Experience daily proves how much our health is dependent upon the quality and purity of our food; consequently, how important it is that an article of such universal consumption as bread should be free from adulteration. That various diseases are caused by the use of *alum* and other deleterious ingredients in the manufacture of bread, the testimony of many eminent men will fully corroborate. Pure unadulterated bread, full weight, best quality, and the lowest possible price."

Upon several samples of this *pure bread*, purchased of various agents of the company, being tested, they were found to be contaminated with *alum!* Here was a discovery. The company protested that the analyses were worthless; and all their workmen made a solemn declaration that they had never used

any alum whilst in their employ. The agents of the company also declared that they never sold any but their bread. The analyst looked again through his microscope, and again reiterated his charge, that alum their bread contained. It was then agreed to test the flour supplied to the company, and three samples were proved to contain the obnoxious material. Thus we find that the miller still, in some instances, maintains his doubtful reputation, and is at the bottom of this roguery.

Our succeeding remarks will fall, we fear, like a bomb upon many a tea-table, and stagger teetotalism in its stronghold. A drunkard's stomach is sometimes exhibited at total-abstinence lectures, in every stage of congestion and inflammation, painted up to match the fervid eloquence of the lecturer. If tea is our only refuge from the frightful maladies entailed upon us by fermented liquors, we fear the British public is in a perplexing dilemma. Ladies, there is death in the teapot! Green-tea drinkers, beware! There has always been a vague idea afloat in the public mind about hot copper plates—a suspicion that gunpowder and hyson do not come by their colour honestly. The old duchess of Marlborough used to boast that she came into the world before "nerves were in fashion." We feel half inclined to believe this joke had a great truth in it; for since the introduction of tea, nervous complaints of all kinds have greatly increased; and we need not look far to find one at least of the causes in the teapot. There is no such a thing as pure green tea to be met with in England. It is adulterated in China; and we have lately learnt to adulterate it at home almost as well as the cunning Asiatic. The pure green tea made from the most delicate green leaves grown upon manured soil, such as the Chinese use themselves, is, it is true, wholly untainted; and we are informed that its beautiful bluish bloom, like that upon a grape, is given by the third process of roasting which it undergoes. The enormous demand for a moderately-priced green tea which has arisen both in England and China since the opening of the trade, has led the Hong merchants to imitate this peculiar colour; and this they do so successfully as to deceive the ordinary judges of the article. Black tea is

openly coloured, in the neighbourhood of Canton in the most wholesale manner.

Mr. Robert Fortune, in his very interesting work, "The Tea Districts of China and India," gives us a good description of the manner in which this colouring process is performed, as witnessed by himself:—

"Having procured a portion of Prussian-blue, he threw it into a porcelain bowl, not unlike a chemist's mortar, and crushed it into a very fine powder. At the same time a quantity of gypsum was produced and burned in the charcoal fires which were then roasting the teas. The object of this was to soften it, in order that it might be readily pounded into a very fine powder, in the same manner as the Prussian-blue had been. The gypsum, having been taken out of the fire after a certain time had elapsed, readily crumbled down, and was reduced to powder in the mortar. These two substances, having been thus prepared, were then mixed together in the proportion of four parts of gypsum to three parts of Prussian-blue, and formed a light blue powder, which was then ready for use.

"This colouring matter was applied to the teas during the process of roasting. About five minutes before the tea was removed from the pans—the time being regulated by the burning of a joss-stick—the superintendent took a small porcelain spoon, and with it he scattered a portion of the colouring matter over the leaves in each pan. The workmen then turned the leaves round rapidly with both hands, in order that the colour might be equally diffused. During this part of the operation the hands of the workmen were quite blue. I could not help thinking, if any green-tea drinkers had been present during the operation, their taste would have been corrected, and, I believe, improved.

"One day an English gentleman in Shanghae, being in conversation with some Chinese from the green-tea country, asked them what reason they had for dyeing the tea, and whether it would not be better without undergoing this process. They acknowledged that tea was much better when prepared without having any such ingredients mixed with it, and that *they never drank dyed teas* themselves, but justly remarked, that, as foreigners seemed *to prefer having a mixture of Prussian-blue and gypsum with their tea* to make it look uniform and pretty, and as these ingredients were cheap enough, the Chinese had no objection to supply them, especially as such teas always fetched a higher price.

"I took some trouble to ascertain precisely the quantity of colouring matter used in the process of dyeing green teas, not certainly with the view of assisting others, either at home or abroad, in the art of colouring, but simply to show green-tea drinkers in England, and more particularly in the United States of America, what *quantity* of Prussian-blue and gypsum they imbibe in the course of one year. To 14½ lbs. were applied 8 mace 2½ candareens of colouring matter, or rather more than an ounce. To every hundred pounds of coloured green-tea consumed in England or America, the consumer actually drinks more than half a pound of Prussian-blue and gypsum. And yet, tell the drinkers of this coloured tea that the Chinese eat cats and dogs, and they will hold up their hands in amazement, and pity the poor Celestials."

If the Chinese use it in these quantities to tinge the genuine

leaf, how much more must the English employ in making up afresh exhausted leaves! That every spoonful of hyson or gunpowder contains a considerable quantity of this deleterious dye will be seen by any one who places a pinch upon a fine sieve, and pours upon it a gentle stream of water, when the tinging of the liquid will show at once the extent of the adulteration, and the folly of drinking painted tea. Assam tea, though not so inviting in colour, is free from adulteration. A word to the wise is enough.

Of fifty samples of green tea analyzed by Dr. Hassall, all were adulterated. There is one particular kind which is almost entirely a manufactured article—gunpowder, both black and green—the former being called scented caper. Both have a large admixture of what is termed "lye tea," or a compound of sand, dirt, tea-dust, and broken-down portions of other leaves worked together with gum into small nodules. This detestable compound, which, according to Mr. Warrington,* who has analyzed it, contains forty-five per cent. of earthy matter, is manufactured both in China and in England, for the express purpose of adulterating tea. When mixed with "scented caper," it is "faced" with black lead; when with gunpowder, Prussian-blue: turmeric and French chalk give it the required bloom. Mr. Warrington states that about 750,000 lbs. of this spurious tea have been imported into Great Britain within eighteen months! Singularly enough, the low-priced teas are the only genuine ones. Every sample of this class which was analyzed by Dr. Hassall proved to be perfectly pure. Here at least the poor have the advantage of the better classes, who pay a higher price to be injured in their health by a painted beverage.

The practice of redrying used-up leaves is also carried on to some extent in England. Mr. George Philips, of the Inland Revenue Office, states that in 1843 there were no less than eight manufactories for the purpose of redrying tea-leaves in London alone, whilst there were many others in different parts

* In an article upon the teas of commerce, which appeared in the *Quarterly Journal of the Chemical Society* for July, 1851.

of the country. These manufacturers had agents who bought up the used leaves from hotels, clubs, coffeehouses, &c., for twopence halfpenny and threepence per lb. With these leaves, others of various trees were used, and very fine pekoe still flourishes upon the hawthorn-bushes, sloe-trees, &c., around the metropolis. As late as the year 1851 the following account of the proceedings of one of these nefarious manufacturers appeared in the *Times* :—

"CLERKENWELL.—Edward South and Louisa his wife were placed at the bar, before Mr. Combe, charged by Inspector Brennan, of the E division, with being concerned in the manufacture of spurious tea. It appeared, from the statement of the inspector, that, in consequence of information that the prisoners and others were in the habit of carrying on an extensive traffic in manufacturing spurious tea, on the premises situate at 27½, Clerkenwell Close, Clerkenwell Green, on Saturday evening, at about seven o'clock, the witness, in company with Serjeant Cole, proceeded to the house, where they found the prisoners in an apartment busily engaged in the manufacture of spurious tea. There was an extensive furnace, before which was suspended an iron pan, containing sloe-leaves and tea-leaves, which they were in the practice of purchasing from coffeeshop-keepers after being used. On searching the place they found an immense quantity of used tea, bay-leaves, and every description of spurious ingredients for the purpose of manufacturing illicit tea, and they were mixed with a solution of gum and a quantity of *copperas*. The woman was employed in stirring about the bay-leaves and other composition with the solution of gum in the pan ; and in one part of the room there was a large quantity of spurious stuffs, the exact imitation of genuine tea. In a back room they found nearly a hundred pounds weight of redried tea-leaves, bay-leaves, and sloe-leaves, all spread on the floor drying. . . . . Mr. Brennan added, that the prisoners had pursued this nefarious traffic most extensively, and were in the habit of dealing largely with grocers, chandlers, and others in the country."

This poisonous imitation green tea, "so largely supplied to country grocers," was no doubt used for adulterating other green teas already dosed with Prussian-blue, turmeric, &c. These have found their way into many a country home of small means. When the nephew comes on a visit, or the curate calls of an afternoon, the ordinary two spoonfuls of black are "improved" with "just a dash of green," and the poor innocent gentleman wonders afterwards what it can be that keeps him awake all night.

We often hear the remark from old-fashioned people that we have never had any good tea since the monopoly of the East-

India Company was broken up: in this remark there is some truth and much error. There can be no possible doubt that the higher-priced teas have fallen off since the trade has been open, as the buyers of the company were perfectly aware of the frauds perpetrated by the Hong merchants, and never allowed a spurious article to be shipped. On the other hand, the great reduction which has taken place in the price of the common black teas, both on account of the cessation of monopoly and the reduction of the duty, has in a great measure destroyed the English manufacture of spurious tea from indigenous leaves. The extent to which this formerly took place may be judged from a report of the Committee of the House of Commons, in 1783, which states that no less than four millions of pounds were annually manufactured from sloe and ash leaves in different parts of England; and this, be it remembered, when the whole quantity of genuine tea sold by the East-India Company did not amount to more than six millions of pounds annually.

If the better class of black and all green teas* are thus vilely adulterated, the reader may fancy he can at least take refuge in coffee—alas! in too many cases he will only avoid Scylla to fall into Charybdis. Coffee, as generally sold in the metropolis and in all large towns, is adulterated even more than tea. The Treasury minute, which allowed it to be mixed with chicory, is at the head and front of the offending. In the year 1840, this celebrated minute was issued by the sanction of the then Chancellor of the Exchequer, Sir C. Wood, the immediate consequence of which was that grocers began to mix it with pure coffee in very large quantities, quite forgetting to inform the public of the nature of the mixture, and neglecting at the same time to lower the price. The evil became so flagrant that upon the installation of the Derby administration Mr. Disraeli promised to rescind this license to adulterate; but before the promise was redeemed, the administration was rescinded itself.

* Assam tea is the only exception to this rule, but very little of it is imported.

Mr. Gladstone, upon his acceptance of office, loath, it appears, to injure the chicory interest, modified the original minute, but allowed the amalgamation to continue, provided the package was labelled "Mixture of Chicory and Coffee." It was speedily found, however, that this announcement became so confounded with other printing on the label that it was not easily distinguishable, and in consequence it was provided that the words, "This is sold as a mixture of Chicory and Coffee," should be printed by themselves on one side of the canister. It may be asked what is the nature of this ingredient, that the right to mix it with coffee should be maintained by two Chancellors of the Exchequer, during a period of fifteen years, as jealously as though it were some important principle of our constitution? Chicory, to say the best of it, is an insipid root, totally destitute of any nourishing or refreshing quality, being utterly deficient in any nitrogenized principle, whilst there are strong doubts whether it is not absolutely hurtful to the nervous system. Professor Beer, the celebrated oculist of Vienna, forbids the use of it to his patients, considering it to be the cause of amaurotic blindness. Even supposing it to be perfectly harmless, we have a material of the value of 8*d.* a pound, which the grocer is allowed to mix, *ad libitum*, with one worth 1*s.* 4*d.* If the poor got the benefit of the adulteration, there might be some excuse for permitting the admixture of chicory, but it is proved that the combination is sold in many shops at the same price as pure coffee.

Analyses made by Dr. Hassall of upwards of a hundred different samples of coffee, purchased in all parts of the metropolis before the issuing of the order for the labelling of the packages 'chicory and coffee,' proved that, in a great number of cases, articles sold as "finest Mocha," "choice Jamaica coffee," "superb coffee," &c., contained, in some instances, very little coffee at all; in others "only a fifth, a third, half," &c., the rest being made up mainly of chicory. Nothing is more indicative of the barefaced frauds perpetrated by grocers upon the public than the manner in which they go out of their way to puff in the grossest style the most abominable trash. The report of

the sanitary commission gives many examples of these puffs and announcements, which, we are informed, are kept set up at the printers, and may be had in any quantities. We quote one as an example :—

"JOHN ———'s COFFEE,

"The richness, flavour, and strength of which are not to be surpassed.

"Coffee has now become an article of consumption among all classes of the community. Hence the importance of supplying an article of such a character as to encourage its consumption in preference to beverages the use of which promotes a vast amount of misery:

"John ———'s coffee meets the requirement of the age, and, as a natural result, the celebrity to which it has attained is wholly unparalleled. Its peculiarity consists in its possessing that rich aromatic flavour, combined with great strength and deliciousness, which is to be found alone in the choicest mountain growths. It may, with perfect truth, be stated that no article connected with *domestic economy* has given such general satisfaction, and the demand for it is rapidly increasing.

"John ———'s establishment, both for extent and capability, is the first in the empire.

"Observe!

"Every canister of John ———'s coffee bears his signature, without which none is *genuine.*"

At the end of this puff the analyst places the words—

"Adulterated with a considerable quantity of chicory!"

More erudite grocers treat us to the puff literary, as in the following instance :—

"Rich-flavoured coffees fresh-roasted daily.

"USE OF COFFEE IN TURKEY.

"Sandys, the translator of 'Ovid's Metamorphoses,' and who travelled in Turkey in 1610, gives the following passage in his 'Travailes,' page 51 (edit. 1657). Speaking of the Turks, he says, 'Although they be destitute of taverns, yet they have their coffee-houses, which sometimes resemble them. There sit they chatting most of the day, and sip of a drink called coffa, of the berry that it is made of, in little china dishes, as hot as they can suffer it, black as soot, which helpeth, as they say, digestion, and procureth alacrity.'"

This pleasant sample of the puff indirect has also appended to it the naked sentence—

"Adulterated with chicory, of which not less than half the sample consists."

The worst kinds of adulterated coffee are to be found in that

which is sold in canisters. The value of the tin envelope cannot be less than 2d., and, as the coffee so sold is charged at the same price as that in a paper wrapper, it must be evident that a more extensive adulteration is necessary in order to make up the difference. Such, upon examination, proves to be the case, as it appeared—

"That the whole twenty-nine packages, bottles, and canisters submitted to analysis, with a single exception,* were adulterated.

"That in these twenty-eight adulterated samples the falsification consisted of so-called chicory, which in many instances constituted the chief part of the article.

"That three of the samples contained mangold-wurzel, and two of them roasted wheat-flour."

We have said it often happens that the adulterations are adulterated. Chicory is an instance of it. The original fraud is found to have ramified in an endless manner; and Sir Charles Wood will doubtless be astonished to hear of the hideous crop of falsifications his most unfortunate order has caused to spring out of the ground.

Immediately the process of transforming chicory into coffee became legalized by the Government, that article came into very extensive consumption, and factories were set up especially for its secret manufacture. The reason for this secrecy may be gathered from the list of articles which are made to subserve the purpose: roasted wheat, ground acorns, roasted carrots, scorched beans, roasted parsnips, mangold-wurzel, lupin-seeds, dog's biscuits, burnt sugar, *red earth*, roasted horse-chestnuts,—and above and beyond all *baked horses' and bullocks' livers*. This statement rests upon the authority of Mr. P. G. Simmonds, in a work entitled "Coffee as it is, and as it ought to be:"—

"In various parts of the metropolis," he says, "but more especially in the east, are to be found 'liver bakers.' These men take the livers of oxen and horses, bake them, and grind them into a powder, which they sell to the low-priced coffeeshop-keepers, at from fourpence to sixpence per lb., horse's liver coffee being the highest price. It may be known by allowing the coffee to stand until cold, when a thick pellicle or skin will be found on

* That sold by Messrs. Dakin, of St. Paul's Churchyard.

the top. It goes farther than coffee, and is generally *mixed with chicory*, and other vegetable imitations of coffee."

In confirmation of this horrible statement the sanitary commissioners of the Lancet state that, on analysis, this substance, which

"possessed a disagreeable animal smell, . . . consisted of some imperfectly-charred animal matter."

The new regulation, enjoining grocers to sell coffee and chicory properly labelled as such, is, no doubt, observed in respectable shops; but in the low neighbourhoods the mixture as before is passed off for genuine Mocha. However, the purchaser has the means of protection in his own hands. If he prefers coffee pure, let him buy the roasted berry and grind it himself; he will thus be sure of having the real article, and will get it in greater perfection than by purchasing it ready ground.

In close proximity to the tea and coffee-pots stand the milk-jug and the sugar-basin. What find we here? A few years ago the town was frightened from its propriety by a little work entitled "Observations on London Milk," published by a medical gentleman of the name of Rugg, which gave some fearful disclosures relative to the manner in which London milk was adulterated. Dr. Hassall's analyses go to show that, with the exception of the produce of the "iron-tailed cow," none of the supposed defilements really exist, and that the milkman is a sadly maligned individual. Water is added in quantities varying in different samples from 10 to 50 per cent.; and in the more unfashionable parts of the town *all* the cream is abstracted to be forwarded to the West-end. If milk *must* be adulterated in large towns, water is undoubtedly the most harmless ingredient; at the same time it will be seen what a fraud is perpetrated upon the public by selling milky water at 4d. a quart.

That the London milking-pail goes as often to the pump as to the cow we have no manner of doubt. To bring the diluted

goods up to a delicate cream colour, it is common to swing round a ball of annatto in the can; and other careful observers and writers upon the adulteration of food have detected flour, starch, and treacle. All medical men know that children are often violently disordered by their morning or evening portion,—an effect which could not come from the mere admixture of water—and we must confess that we ourselves believe the milkman to be a very wicked fellow.

We are afraid, if we look into the sugar-basin, we shall not find much more comfort than in the milk-jug. We refer here to the ordinary brown sugars, such as are generally used at the breakfast-table for coffee. It is scarcely possible to procure moist sugar which is not infested with animalculæ of the acari genus, a most disgusting class of creatures. In many samples of sugars they swarm to that extent that the mass moves with them; and in almost every case, by dissolving a spoonful in a wine-glass of water, dozens of them can be detected by the naked eye, either floating upon the liquid or adhering to the edge of the glass. Those who are in the habit of "handling" sugars, as it is termed, are liable to a skin affection called the grocer's itch, which is believed to be occasioned by these living inhabitants of our sugar-basins. Horrible as it is to think that such creatures are an article in daily use, we cannot charge the grocer directly with their introduction; the evil is, however, increased by the manner in which he mixes, or "handles," as it is termed in the trade, higher-priced sugars with muscovados, bastards, and other inferior kinds, in which the animalculæ abound.

In addition to this foreign animal element, grocers sometimes mix flour with their sugar, and, if we are to put any credit in popular belief, sand; but of the presence of this gritty ingredient we have never seen any trustworthy evidence. Nevertheless we have said enough to show that the tea-dealer and grocer do their best to supply the proverbial "peck of dirt" which all of us must eat before we die. Would that we were fed with nothing more deleterious or repulsive! Let us see,

however, the base admixtures one is liable to swallow in taking—

A Cup of Tea	*or a*	Cup of Coffee.
In the Tea.		*In the Coffee.*
If Green—		Chicory.
Prussian-blue.		*In the Chicory.*
Turmeric.		Roast wheat.
China clay or French chalk.		,, acorn.
Used tea-leaves.		,, mangold-wurzel.
Copperas.		,, beans.
If Black—		,, carrots.
Gum.		,, parsnips
Black lead.		,, lupin-seeds.
Dutch pink.		,, dog-biscuits.
Used tea-leaves.		,, horse-chestnuts.
Leaves of the ash, sloe, hawthorn, and of many other kinds.		Oxide of iron.
		Mahogany sawdust.
		Baked horse's liver.
		,, bullock's liver.
In the Milk.		*In the Milk.*
On an average 25 per cent. of water.		Water 25 per cent.
Annatto.		Annatto.
Treacle.		Flour.
Flour.		Treacle.
Oxide of iron.		Oxide of iron.
And other unknown ingredients.		And other unknown ingredients.
In the Sugar.		*In the Sugar.*
If Brown—		If Brown—
Wheat flour.		Wheat flour.
Hundreds of the sugar-insect.		Hundreds of the sugar-insect.
If White—		If White—
Albumen of bullock's blood.		Albumen of bullock's blood.

As we perceive the teetotalers are petitioning Parliament and agitating the towns for the closing of public-houses, we beg to present them, in either hand, with a cup of the above mixtures, with the humble hope that means will be found by them to supply the British public with some drink a little less deleterious to health, a little more pleasant to the palate, and somewhat less disgusting to the feelings. Some of the sugar impurities may be avoided by using the crystallized East-Indian kind—the size of the crystals not permitting of its being adulterated with inferior sorts.

We shall not dwell upon cocoa further than to state that it is a still rarer thing to obtain it pure than either tea or coffee. The almost universal adulterations are sugar, starch, and flour,

together with red colouring matter, generally some ferruginous earth; whilst, as far as we can see, what is termed homœopathic cocoa is only distinguished from other kinds by the small quantity of that substance contained in it.

There is scarcely an article on the breakfast-table, in fact, which is what it seems to be. The butter, if salt, is adulterated with between 20 and 30 per cent. of water. A merchant in this trade tells the *Lancet* that "between 40,000 and 50,000 casks of adulterated butter are annually sold in London, and the trade knows it as well as they know a bad shilling." Lard when cheap also finds its way to the butter-tub. Perhaps those who flatter themselves that they use nothing but "Epping" will not derive much consolation from the following letter, also published in the same journal:—

"*To the Editor of the Lancet.*

"SIR,—Having taken apartments in the house of a butterman, I was suddenly awoke at three o'clock one morning with a noise in the lower part of the house, and alarmed on perceiving a light below the door of my bed-room; conceiving the house to be on fire, I hurried down stairs. I found the whole family busily occupied, and, on my expressing alarm at the house being on fire, they jocosely informed me they *were merely making Epping butter*. They unhesitatingly informed me of the whole process. For this purpose they made use of fresh-salted butter of a very inferior quality: this was repeatedly washed with water in order to free it from the salt. This being accomplished, the next process was to wash it frequently with milk, and the manufacture was completed by the addition of a small quantity of sugar. The amateurs of fresh Epping butter were supplied with this dainty, which yielded my ingenious landlord a profit of at least 100 per cent., besides establishing his shop as being supplied with Epping butter from one of the first-rate dairies.—I am, sir, your obedient servant,

"A STUDENT."

If we try marmalade as a succedaneum, we are no better off—at least if we put any faith in "real Dundee, an excellent substitute for butter," to be seen piled in heaps in the cheap grocers' windows. Dr. Hassall's analysis proves that this dainty is adulterated to a large extent with turnips, apples, and carrots: we need not grumble so much at these vegetable products, excepting on the score that it is a fraud to sell them at 7d. a pound; but there is the more startling fact that, in twelve out of fourteen samples analysed, copper was detected, and sometimes in large and deleterious quantities!

Accum, in his "Death in the Pot," quotes, from cookery-books of reputation in his day, recipes which make uninitiated persons stare. For instance, "Modern Cookery, or the English Housewife," gives the following serious directions "to make Greening:"—"Take a bit of *verdigris the bigness of an hazel-nut*, finely powdered, half a pint of distilled vinegar, and a bit of alum-powder, with a little baysalt; put all in a bottle and shake it, and let it stand till clear. *Put a small teaspoonful into codlings, or whatever you wish to green!*"

Again, the "English Housekeeper," a book which ran through eighteen editions, directs—"to make pickles green *boil them with halfpence*, or allow them to stand for twenty-four hours in copper or brass pans!" Has the notable housewife ever wondered to herself how it is that all the pickles of the shops are of so much more inviting colour than her own? We will satisfy her curiosity in a word—she has forgotten the "bit of verdigris the bigness of a hazel-nut," for it is now proved beyond doubt that to this complexion do they come by the use of copper, introduced for the sole purpose of making them of a lively green. The analyses of twenty samples of pickles bought of the most respectable tradesmen proved, firstly, that the vinegar in the bottles owed most of its strength to the introduction of sulphuric acid; secondly, that, out of sixteen different pickles analysed for the purpose, copper was detected in various amounts. Thus, "two of the samples contained a small quantity; eight rather much, one a considerable quantity, three a very considerable quantity; in one copper was present in a highly deleterious amount, and in two *in poisonous amounts*. The largest quantity of this metal was found in the bottles consisting entirely of green vegetables, such as gherkins and beans."

We trust after this the good housewife will feel jealous no longer, but rest satisfied that the home-made article, if less inviting and vivid in colour, is at least more wholesome. A simple test to discover the presence of copper in such articles is to place a bright knitting-needle in the vinegar, and let it remain there for a few hours, when the deleterious metal will speedily form a coating over it, dense or thin, according to the

amount which exists. Wherever large quantities are found, it is wilfully inserted for the purpose of producing the bright green colour, but a small quantity may find its way into the pickles in the process of boiling in copper pans. Messrs. Crosse and Blackwell, the great pickle and preserve manufacturers in Soho, immediately they became aware, from the analyses of the *Lancet*, that such was the case, in a very praiseworthy manner substituted silver and glass, at a great expense, for all their former vessels. The danger arising from the introduction of this virulent poison into our food would not be so great if it were confined to pickles, of which the quantity taken is small at each meal, but it is used to paint all kinds of preserves, and fruits for winter pies and tarts are bloomed with death. The papa who presents his children the box of sweetmeats bedded in coloured paper, and enclosed in an elegant casket, may be corroding unawares the very springs of their existence. As a general rule, it is found that the red fruits, such as currants, raspberries, and cherries, are uncontaminated with this deleterious metal, but owe their deep hue to some red colouring matter, such as a decoction of logwood or an infusion of beetroot, in the same way that common white cabbage is converted into red by the nefarious pickle-merchant. The green fruits are not all deleterious in the same degree; there seems to be an ascending scale of virulence, much after the following manner:—Limes, gooseberries, rhubarb, greengages, olives—the last-mentioned fruit, especially those of French preparation, generally containing verdigris, or the acetate of copper, *in highly dangerous quantities*. The *Lancet* publishes a letter from Mr. Bernays, F.C.S., dated from the Chemical Library, Derby, in which he shows the necessity of watchfulness in the purchase of these articles of food:—

"Of this," he says, "I will give you a late instance. I had bought a bottle of preserved gooseberries from one of the most respectable grocers in the town, and had its contents transferred to a pie. It struck me that the gooseberries looked fearfully green when cooked; and in eating one with a steel fork its intense bitterness sent me in search of the sugar. After having sweetened and mashed the gooseberries, with the same steel fork, I was about to convey some to my mouth, when I observed the prongs

to be completely coated with a thin film of bright metallic copper. My testimony can be borne out by the evidence of others, two of whom dined at my table."

It was fortunate that these three gentlemen used steel forks, which instantly disclosed the mischief; if they had chanced to use silver, all three might have fallen victims to these poisonous conserves.

But we are not yet at the worst. When Catherine de' Medici wished to get rid of obnoxious persons in an "artistic" manner, she was in the habit of presenting them with delicately made sweetmeats, or trinkets, in which death lurked in the most engaging manner; she carried—

> "Pure death in an earring, a casket,
> A signet, a fan-mount, a filigree basket."

Her poisoned feasts are matters of history, at which people shudder as they read; but we question if the diabolical revenge and coldblooded wickedness of an Italian woman ever invented much more deadly trifles than our low, cheap confectioners do on the largest scale. We select from some of these articles of bonbonerie the following feast, which we set before doting mothers, in order that they may see what deadly dainties are prepared for the especial delectation of their children :—

"A Fish.

"*Purchased in Shepherd's Market, May Fair.*

"The tip of the nose and the gills of the fish are coloured with the usual pink, while the back and sides are highly painted with that virulent poison *arsenite of copper.*

"A Pigeon.

"*Purchased in Drury Lane.*

"The pigments employed for colouring this pigeon are light yellow for the beak, red for the eyes, and orange yellow for the base or stand. The yellow colour consists of the light kind of chromate of lead, for the eyes bisulphate of mercury, and for the stand the deeper varieties of chromate of lead, or orange chrome."

"Apples.

"*Purchased in James Street, Covent Garden.*

"The apples in this sample are coloured yellow, and on one side deep red; the yellow colour extending to a considerable depth in the substance of the sugar. The red consists of the usual non-metallic pigment, and the

yellow is due to the presence of CHROMATE OF LEAD in really *poisonous amount!*"

"A COCK.

"*Purchased in Drury Lane.*

"The beak of the bird is coloured bright yellow, the comb brilliant red, the wings and tail are variegated, black, two different reds, and yellow; while the stand, as in most of these sugar ornaments, is painted green. The yellow of the beak consists of CHROMATE OF LEAD; the comb and part of the red colour on the back and wings is VERMILION; while the second red colour on the wings and tail is the usual pink non-metallic colouring matter, and the stripes of yellow consist of gamboge; lastly, the green of the stand is MIDDLE BRUNSWICK GREEN, and, therefore, contains CHROMATE OF LEAD. In the colouring of this article, then, no less than three active poisons are employed, as well as that drastic purgative gamboge!"

"ORANGES.

"*Purchased in Pilgrim Street, Doctors' Commons.*

"This is a very unnatural imitation of an orange, it being coloured with a coarse and very uneven coating of RED LEAD."

"MIXED SUGAR ORNAMENTS.

"*Purchased in Middle Row, Holborn.*

"The confectionery in this parcel is made up into a variety of forms and devices, as hats, jugs, baskets, and dishes of fruit and vegetables. One of the hats is coloured yellow with CHROMATE OF LEAD, and has a green hat-band round it, coloured with ARSENITE OF COPPER; a second hat is white, with a blue hatband, the pigment being PRUSSIAN-BLUE. The baskets are coloured yellow with CHROMATE OF LEAD. Into the colouring of the pears and peaches the usual non-metallic pigment, together with CHROMATE OF LEAD and MIDDLE BRUNSWICK GREEN, enter largely; while the carrots represented in a dish are coloured throughout with a RED OXIDE OF LEAD, and the tops with BRUNSWICK GREEN. This is one of the worst of all the samples of coloured sugar confectionery submitted to analysis, as it contains no less than four *deadly poisons!*"

The painted feast contains, then, among its highly injurious ingredients, ferrocyanide of iron or Prussian-blue, Antwerp-blue, gamboge, and ultramarine, and among its deadly poisons the three chrome yellows, red lead, white lead, vermilion, the three Brunswick greens, and Scheele's green or arsenite of copper. The wonder is that, considering we set such poison-traps for children, ten times more enticing and quite as deadly as those used to bane rats, that the greater number of youngsters who partake of them are not at once despatched; and so undoubtedly they would be if nurses were not cautious about these coloured parts, which have always enjoyed a bad name

under the general denomination of "trash and messes." As it is, we are informed by Dr. Letheby that "no less than seventy cases of poisoning have been traced to this source" within three years!

In France, Belgium, and Switzerland the colouring of confectionery with poisonous pigments is prohibited, and the vendors are held responsible for all accidents which may occur to persons from eating their sugar confectionery. It is absolutely essential that some such prohibition should be made in England. Arsenic, according to law, must be sold coloured with soot, in order that its hue may prevent its being used by mistake for other substances; how absurd it is that we should allow other poisons, quite as virulent, to be mixed with the food of children and adults, merely for the sake of the colour! All kinds of sugar-plums, comfits, and "kisses," in addition to being often adulterated with large quantities of plaster of Paris, are always open to the suspicion of being poisoned. Necessity cannot be urged for the continuance of this wicked practice, as there are plenty of vegetable pigments which, if not quite as vivid as the acrid mineral ones, are sufficiently so to please the eye. Of late years a peculiar lozenge has been introduced, in which the flavour of certain fruits is singularly imitated. Thus we have essence of jargonel drops, essence of pine-apple drops, and many others of a most delicate taste. They really are so delicious that we scarcely like to create a prejudice against them; but the truth is great, and must prevail: all these delicate essences are made from a preparation of æther and rancid cheese and butter.

The manufacturer, perhaps unaware of the cumulative action of many of his chemicals, thinks that the small quantity can do no harm. We have seen, in the matter of preserved fruits and sugar confectionery, how fallacious is that idea. But the practice of adulteration often leads to lamentable results of the same nature, which are quite unintentional on the part of their perpetrators, and which occur in the most roundabout manner. An instance of this is related by Accum, which goes directly to the point. A gentleman, perceiving that an attack of colic

always supervened upon taking toasted Gloucestershire cheese at an inn at which he was in the habit of stopping, and having also noticed that a kitten which had partaken of its rind was rendered violently sick, had the food analyzed, when it was found that lead was present in it in poisonous quantities. Following up his inquiries, he ascertained that the maker of the cheese, not finding his annatto sufficiently deep in colour, had resorted to the expedient of colouring the commodity with vermilion. This mixture, although pernicious and discreditable, was not absolutely poisonous, and certainly could not account for the disastrous effects of the food on the human system. Trying back still further, however, it was at last found that the druggist who sold the vermilion had mixed with it a portion of *red lead*, imagining that the pigment was only required for house paint. "Thus," as Accum remarks, "the druggist sold his vermilion, in a regular way of trade, adulterated with red lead, to increase his profit, without any suspicion of the use to which it would be applied; and the purchaser who adulterated the annatto, presuming that the vermilion was genuine, had no hesitation in heightening the colour of his annatto with so harmless an adjunct. Thus, through the diversified and circulatory operations of commerce, a portion of deadly poison may find admission into the necessaries of life in a way that can attach no criminality to the parties through whose hands it has successively passed." The curious aspect of this circuitous kind of poisoning is, that it occurs through the belief of each adulterating rogue in the honesty of his neighbour.

If we could possibly eliminate, from the mass of human disease, that occasioned by the constant use of deleterious food, we should find that it amounted to a very considerable percentage on the whole, and that one of the best friends of the doctor would prove to be the adulterator. But even our refuge fails us in our hour of need; the tools of the medical man, like those of the sappers and miners before Sebastopol, often turn out to be worthless. Drugs and medical comforts are perhaps adulterated as extensively as any other article. To

mention only a few familiar and household medicines for instance: Epsom salts are adulterated with sulphate of soda; carbonate of soda with sulphate of soda—a very injurious substitute. Mercury is sometimes falsified with lead, tin, and bismuth; gentian with the poisonous drugs aconite and belladonna; rhubarb with turmeric and gamboge; cantharides with black pepper; and cod-liver and castor-oils with common and inferior oils; whilst opium, one of the sheet-anchors of the physician, is adulterated to the greatest extent in a dozen different ways. Medical comforts are equally uncertain. Thus potato-flour forms full half of the so-called arrowroots of commerce; sago-meal is another very common ingredient in this nourishing substance. Out of fifty samples of so-styled arrowroot, Dr. Hassall found twenty-two adulterated, many of them consisting *entirely* of potato-flour and sago-meal. One half of the common oatmeals to be met with are adulterated with barley-meal, a much less nutritious substance—an important fact, which boards of guardians should be acquainted with. Honey is sophisticated with flour-starch and sugar-starch. And lastly, we wish to say something important to mothers. Put no faith in the hundred and one preparations of farinaceous food for infants which are paraded under so many attractive titles. They are all composed of wheat-flour, potato-flour, sago, &c.,—very familiar ingredients, which would not take with anxious parents unless christened with extraordinary names, for which their compounders demand an extraordinary charge. To invalids we would also say, place no reliance on the Revalentas and Ervalentas advertised through the country as cures for all imaginary diseases. They consist almost entirely of lentil-powder, barley-flour, &c., which are charged cent. per cent. above their real value.

Of all the articles we have touched upon, not one is so important as water. It mixes more or less with all our solid food, and forms nine-tenths of all our drinks. Man himself, as a sanitary writer has observed, is in great part made up of this element, and if you were to put him under a press you would squeeze out of him 8½ pailfuls. That it should be furnished

pure to the consumer is of the first importance in a sanitary and economic point of view. We are afraid, however, that but feeble attempts have been made to secure this advantage to the metropolis. At present London, with its two and a half millions of population, is mainly supplied by nine water companies, six of which derive their supply from the Thames, one from the New River, one from the Ravensbourne, and a third from ponds and wells. Besides this supply, which ramifies like a network over the whole metropolis, we find dotted about both public and private wells of various qualities. We do not intend to follow Dr. Hassall into his microscopic representations of the organic matter, vegetable and animal, by which the customers of one company can compare the water served to them with that dealt out to others, and thus at a glance assure themselves that they have not more than their share of many-legged, countless-jointed, hideous animalculæ, which look formidable enough to frighten one from ever touching a drop of London water, but shall content ourselves with giving the general characteristics of the whole of them. With one exception they were all of a hardness ranging from 11 to 18 degrees. This hardness depends upon the earthy salts present, such as sulphates and bicarbonates of lime and magnesia. They were also to some extent saline, as all the salt used in the metropolis ultimately finds its way into the Thames, or great sewer-stream. Not long ago two, at least, of these six Thames water companies procured their supply within a short distance of the mouths of great drains, and all of them resorted to the river at different points below Battersea, or that portion of it which receives the drainage of the metropolis, and is consequently crowded with animal and vegetable matter, both living and dead, and thick with the mud stirred up by the passage to and fro of the steamers. The violent outcry made, however, by the Board of Health, caused an Act to be passed by parliament against the supply of the sewage rates, and now all the companies taking their supplies from the Thames, are compelled to go at least as high as Kingston, and to submit them to a process of filtration; but even at this point the

river is in some degree sewage-tainted, and the chemically-combined portion of baser matter cannot be removed by any filter.

The impurities of the Thames are not all we have to deal with—its hardness must cost the Londoners hundreds of thousands a year in the article of soap alone. The action upon lead is also marked; hence we find poisonous carbonates of that metal held in solution. Plumbers are well aware of this fact, and frequently meet with leaden cisterns deeply corroded. This corrosion may arise from either chemical or voltaic action. The junction of lead and solder, or iron, immersed in water impregnated with salts or acid of any kind, will cause erosion of the metal. A familiar instance of this is seen in the rapid manner in which iron railings rust away just where they are socketed in the stonework with lead. The presence of a piece of mortar on the lead of a cistern may even set up this action, and result in giving a whole family the colic.

The pumps of the metropolis are liable to even more contamination than river-water, inasmuch as the soil surrounding them is saturated with the sewage of innumerable cesspools, and with that arising from the leakage of imperfect drains. Medical men entertained the opinion that the terrible outbreak of cholera in Broad Street, Golden Square, in 1854, arose from the fact that the people in the neighbourhood were in the habit of visiting a public pump which was proved to be foul with drain-water, and the handle of which was taken off, to prevent further mischief. Some of these public pumps appear to yield excellent water—cold, clear, and palatable; but the presence of these qualities by no means proves that they are pure. The bright sparkling icy water issuing from the famous Aldgate pump, according to Mr. Simon, the city officer of health, owes its most prized qualities to the nitrates which have filtered into the well from the decaying animal matter in an adjoining churchyard.

The porter and stout of the metropolis have long been famous. The virtues of the latter drink are celebrated all over the world; and a royal duke, ascribed the great

mortality among the guards in the East to the want of their favourite beverage. No doubt the pure liquor, as it comes from the great brewers, is wholesome and strengthening; but it no sooner gets into the possession of the publicans than, in a great majority of cases, the article is made up. A stranger would naturally suppose that the foaming tankard of Meux's entire which he quaffs at the "Marquis of Granby" has an identical flavour with that at the "Blue Boar," where the same brewer's name shines resplendent on the house-front. Not a bit of it: one shall be smooth, pleasantly bitter, slightly acid, and beaded with a fine and persistent froth; the other, bitter with the bitterness of soot, salt, clammy, sweet, and frothing with a coarse and evanescent froth. The body of the liquor is undoubtedly the same, but the variations are all supplied by the publicans and sinners. We do not make *émeutes*, as they are continually doing in Bavaria, on account of our beer; but we have strong feelings on a matter of such national importance; and the wicked ways of brewers and publicans have been made, over and over again, the subject of parliamentary inquiry. The reports of various committees prove that, in times past, porter and stout were doctored in the most ingenious manner, and so universally and unreservedly, that a trade sprang up termed brewers' druggists, whose whole business it was to supply to the manufacturers and retailers of the national beverage, ingredients for its adulteration; nay, to such an extent did the taste for falsifying beer and porter extend, that one genius, hight Jackson, wrote a hand-book to show the brewers how to make Beer *without any Malt or Hops at all!* Accum has preserved, in his now antique pages, some of the recipes in vogue in his day. The boldness with which our fathers went to work is amusing. For instance, Mr. Child, in his "Practical Treatise on Brewing," after having made his non-professional reader aghast by mentioning a score of pernicious articles to be used in beer, remarks, in the mildest possible manner,—

"That, however much they may surprise—however pernicious or disagreeable they may appear, he has always found them requisite in the

brewing of porter, and he thinks they must invariably be used by those who wish to continue the taste, flavour, and effervescence of the beer. And, though several acts of Parliament have been passed to prevent porter brewers from using many of them, yet the author can affirm, from experience, he could never produce the present flavoured porter without them. *The intoxicating qualities of porter are to be ascribed to the various drugs intermixed with it.* It is evident some porter is more heady than other, and it arises from the greater or less quantity of stupefying ingredients. Malt, to produce intoxication, must be used in such large quantities as would very much diminish, if not totally exclude, the brewer's profit."

It is clear from this extract that Mr. Child considered the end of all successful brewing was to make people dead-drunk at the cheapest possible rate, regardless of consequences. Among the ingredients that Mr. Morris, another instructor in the art of brewing, tells us are requisite to produce a popular article, are—cocculus indicus and beans, as intoxicators; calamus aromaticus, as a substitute for hops; quassia, as a bitter; coriander-seeds to give flavour; capsicums, carraway-seeds, ginger, and grains of paradise, to give warmth; whilst oyster-shells are recommended to afford a touch of youth to old beer, and alum to give a "smack of age" to new; and when it is desired to bring it more rapidly "forward," the presiding Hecate is told to drop sulphuric acid into her brew; by this means an imitation of the age of eighteen months was given in a few instants. Even the "fine cauliflower head," which is held to be the sign of excellence in stout, was—and, for all we know, still is—artificially made by mixing with the article a detestable compound called "beer-headings," composed of common green vitriol, alum, and salt, and sometimes by the simple addition of salts of steel. That these articles were commonly employed we have the evidence of the Excise Department, which published a long list of such ingredients seized by them on the premises of brewers and brewers' druggists.* Many of these glaring adulterations are probably no longer in general use, although, from the evidence given before a recent committee of the House of Commons,

* It will be scarcely necessary to say that the great London brewers have never laid themselves open to the suspicion of having adulterated their liquor.

it is believed that sulphuric acid, salt of steel, sulphate of iron, and cocculus indicus are still resorted to by the smaller brewers, especially those living in the country—a belief very much strengthened by the very odd taste we sometimes find in ales and porters, and which is certainly not derived from malt and hops. The common method of adulterating the national liquor is by mixing water with it. This is done almost universally by the publican, and to a very extraordinary extent. A comparison between the per-centage of alcohol to be found in a given number of samples of porter and stout, procured from what is termed brewers' taps, or agents, with that existing in a similar number of samples purchased of publicans, proves this fact in a very convincing manner. Dr. Hassall informs us that, with regard to the stouts,—

"The alcohol—of specific gravity 796, temperature 60° Fahr.—contained in the former samples ranged from 7·15 per cent. the highest, to 4·53 the lowest; whereas that of the stouts procured from publicans varied, with one exception, from 4·87 per cent. to 3·25 per cent."

The same difference of strength also existed between the various samples of porter procured from the two sources; the amount of alcohol in that obtained from the taps varying from 4·51 per cent. to 2·42 per cent., whereas that purchased of publicans ranged from 3·97 per cent. to 1·81 per cent. The mixture of water, of course, reduces the colour, to bring up which both burnt sugar and molasses are extensively used; and, in order that "the appetite may grow with what it feeds on," tobacco and salt are copiously added by the publican. Beer, porter, and stout are also liable to be contaminated by the presence of lead. The universal use of pumping machines and the storing of the casks in the cellars, sometimes at a considerable distance from the bar, necessitates the use of long leaden pipes, in passing through which the liquid, if "stale" or sour, oxidates a portion of the lead. This fact is so well known both to public and publican, that the first pot or two drawn in the morning is generally set aside, as, from having lain all night in the pipe, it is justly considered injurious. The liberality of the barmaid in thus sacrificing a portion of

the liquor is more apparent than real. The reader has, perhaps, noticed that most public-house counters are fitted up with metal tops, in which gratings are inserted to drain off all the spilt liquor, drainings of glasses, heel-taps of pots, &c.: down these gratings goes "the first draught," with its dose of oxide of lead. The receptacle below, which contains all this refuse together with that at the bottoms of barrels, the publican either returns to the brewer, or empties it himself into half-filled casks.

The public were very needlessly alarmed some years ago by a statement made by M. Payen, a celebrated French chemist, that strychnine was being made for England, where it was used in the manufacture of the bitter beer of this country. This statement was copied by the *Medical Times*, and from thence, finding its way to Printing-house Square, became generally diffused, to the horror and discomfiture of pale-ale drinkers; and not without reason, when it is remembered that one-sixth of a grain of this poison has been known to prove fatal, and a very much smaller quantity daily taken, to have the effect of inducing tetanic spasms, and of otherwise seriously injuring the nervous system. We are happy to be able to state that the lovers of Bass and Allsopp may quaff their tonic draught in future without any fear of such terrible results. The bitterness of pale ale has been found, on analysis, to be entirely due to the extract of hops. Furthermore, this beverage, when selected from the stores of the brewers or their agents, has universally proved to be perfectly pure. We say, from the stores of the Burton brewers or their agents, because there is no absolute certainty of procuring the article genuine from any other source. The label on the bottle is no sure guarantee; for used bottles, with their labels intact, are in many instances refilled by publicans with an inferior article, and sold, of course, at the price of the real. We have good reason to believe that this trick is very often practised in a variety of instances, to the manifest injury of the public and brewers.

Wine is far too wide a subject to be treated here. The great

mass of ports at a cheap and moderate price are made up, it is well known, of several kinds, and doctored according to cost. There is one compound, however, which particularly claims our attention, "publicans' port." We are all of us familiar with the announcement to be seen in the windows of such tradesmen, "Fine old crusty port, 2*s* 9*d*. a bottle;" and the extraordinary thing is, that upon opening the sample we often find that *it is* crusted, and that the cork is deeply stained. How can they afford to sell an article bearing the appearance of such age and quality at so low a price? The answer is simple: wine, crust, and stained cork are fabricated. There is a manufactory in London, where, by a chemical process, they get up beeswing to perfection, and deposit it in the bottles so as exactly to imitate the natural crust; here corks are also stained to assume any age that is required. The wine itself contains a very little inferior port, the rest being composed of cheap red French wine, brandy, and logwood as a colouring matter, if required. The port wine sold over the bar at 3*d*. a glass—and we are assured that this article is making its way in preference to gin in the low neighbourhoods, one gin palace, to our knowledge, selling a butt a week over the counter—is an inferior article even to this, and its taste is quite sufficient to prove that only an infinitesimal portion of it ever came from Oporto.

London gin, under a hundred names, is notoriously a compound. Most people flatter themselves that its peculiar flavour is due to the admixture of sugar and juniper-berries alone. It is, however, a much more elaborate concoction than the public imagine. Those accustomed to the unsweetened West Country gin think the London article only fit to drink when raw, and in many cases they are right; for the publican and inferior spirit-dealers, like milkmen, are great customers of the pump. It appears that some of the samples examined by the analyst contained only half as much alcohol as was present in others; and as the gin of commerce is never above proof, it follows that these specimens were scarcely as good as "stiff" gin-and-water. So much for the pure spirit; now for the fancy work

or "flavourings." The quantity of sugar in the samples examined ranged from 3 oz. 4 drms. 23 grains, to 13 oz. 4 drms.; two of them contained oil of cinnamon, or, more probably, of cassia; seven contained cayenne pepper, some of them in very large quantities; and most of the samples contained combined sulphates; whilst there is good authority for stating that sulphate of zinc, or white vitriol, is often used. The very "beaded bubbles winking at the brim," which are considered to be a proof of the strength of the article, are produced artificially. Mr. Mitchell, in his "Handbook of Commerce," states that this is done by adding a mixture compounded of alum, carbonate of potash, almond-oil, sulphuric acid, and spirits of wine. "The earth hath bubbles as the water hath, and these are of them." One would think that it would be to the interest of the trade to keep their illicit practices "dark:" but the publican has his "Handbook" to teach him how to adulterate spirit as well as beer. For instance, in a little work on Brewing and Distilling, written by a Mr. Shannon, the following recipe is given:—

"*To reduce unsweetened Gin.*

A tun of fine gin	252 gallons.
Water	36 „
Which added together makes	288 „
The doctor is now put on, and it is further reduced with water	19 „
Which gives	307 gallons.

"This done, let one pound of alum be just covered with water, and dissolved by boiling; *rummage* the whole together, and pour in the alum, and the whole will be fine in a few days."

We wonder that Mr. Gough, the great temperance advocate, never armed himself with one of these recipes, in order to convince people of the noxious liquids they are invited to drink under the most inviting names. In every quarter of the town we see gin-palaces seizing upon the corner houses of the streets, just as scrofula seizes upon the joints of the human frame, and through their ever-open doors streams of squalid wretches are continually pouring in and out. Could they be informed that they enter to gulp oil of vitriol, oil of turpentine, and sulphuric acid, among other acrid and deleterious compounds—that the

tap of the publican spouts corroding fire, like that which leaped up from the wooden table at the command of Mephistopheles, in Auerbach's cellar, they would feel inclined to exclaim with Siebald to the fiend :—

> "What, sir, how dare you practise thus
> Your hocus-pocus upon us?"

Gin, it appears, is almost exclusively doctored in this highly deleterious manner, although all spirits are open to sophistication, but especially brandy, which, on account of its price, pays well for the trouble. Mr. Shannon, deeply versed in the "art and mystery" of the trade of the publican, informs us that brandy should be "made up" for "retail" by the addition of 10 per cent. of flavoured raisin wine, a little of the tincture of grains of paradise, cherry-laurel water, and spirit of almond-cake: "add also 10 handfuls of oak sawdust, and give it *complexion* with burnt sugar."

If we can give the dram-drinker little comfort, we can at least reassure the smoker. "Everybody says" that common cigars are made out of cabbages, and tobacco has always been suspected of containing many adulterations. These charges have been made, however, at random, and the result of chemical analysis and examinations by the microscope has proved that this article of daily consumption is remarkably pure. The carefully-searching microscope of Dr. Hassall has not succeeded in finding any other than the genuine leaf among forty samples of manufactured tobacco; neither were there any sophistications discovered, with the exceptions of salt, sugar, and water. An inquiry into the specimens of the rolled and twisted article was equally consoling to the maker and chewer. Now and then, it is true, the excise officers make seizures in the warehouses of the tobacco manufacturers, of dock, rhubarb, coltsfoot, and other leaves, but to a very insignificant extent, considering the value of the article and the heavy duty upon it.

He who, like Byron, prefers the naked beauties of the leaf in the shape of a cigar, will be equally gratified to hear that such a thing as adulteration scarcely exists in this form of tobacco—

at least, not when purchased in the shops. Even if we descend to a penny "Pickwick," we find nothing in it but the pure leaf. Out of fifty-seven samples examined, only one was sophisticated, and that, apparently from its contents, by accident. The only adulterated samples discovered at all, were exactly where we might have expected to have found them, in the possession of a hawker at Whitechapel. These, on examination, turned out to be made up of two twisted wrappers or layers of thin paper, tinted of a bistre colour, while the interior consisted entirely of hay, not a particle of tobacco entering into their composition. The second example of a spurious cigar was purchased at a review in Hyde Park. It consisted externally of tobacco-leaf, but was made internally of hay. Our readers are familiar enough with the fellows who vend these fraudulent articles, made to sell and not to smoke; they are generally to be found at fairs and races, or any crowded place in the open air, where they can escape speedily from their victimized customers. There is a class of men who make a very good livelihood in the metropolis by perambulating the streets and looking out for ingenuous youths. Towards such they furtively approach, and, like the tempter of old, whisper in their ear of forbidden fruit. The unwary are constantly taken in by one of these serpents, in the shape of a sailor straight from the docks, who intimates, in a hurried manner, that, if we wanted any "smuggled cigars," he has just a box to sell cheap round the corner. In general these worthies need not fear the exciseman, as the article they have to sell does not come under the name of tobacco at all.

If, however, cigars are not open to the charge of being adulterated, they are the subject of innumerable frauds, inasmuch as those of English manufacture are passed off as foreign ones. Thus, the so-called Bengal cheroots are *all* home-made imitations of Chinsurah cheroots. In order to pass them off as the genuine article they are sold in boxes, branded and labelled in exact imitation of those sent from India. It may be asked why such cigars, if made out of the tobacco-leaf, are not as good as those of Eastern or Spanish manufacture. The real reason is, that the tobacco loses much of its fine flavour and aroma by packing

and keeping ; otherwise the English cigar would be equal to any other. The old impression that the Manilla cheroot is impregnated with opium would not appear to be correct, from the investigations of Dr. Hassall, who has failed to discover that narcotic in any of the specimens which he tested for it.

We have to mention one preparation of tobacco of which we cannot speak quite so favourably as of the others. Snuff is, we are sorry to say, vilely adulterated, and some kinds poisonously. The law allows the use of salt and water and lime-water in its manufacture—a privilege which the snuff-makers take advantage of to increase its weight, all moist snuffs averaging full twenty-five per cent. of water. If these were the only adulterations to the titillating powder, no harm would be done; but we have positive evidence afforded us in the report of the "Lancet" Commission, that, in addition to ferruginous earths, such as red and yellow ochre, no less than three poisonous preparations are also introduced into it—chromate of lead, red-lead, and bi-chromate of potash ! When a man taps his snuff-box and takes out a pinch, he little dreams that he is introducing an enemy into his system, which in the long-run might master his nerves and produce paralysis; nevertheless it is an undoubted fact. Many persons have been deprived of the use of their limbs through a persistence in taking snuff adulterated with lead in less proportions than that found in the samples examined by Dr. Hassall. Bi-chromate of potash is a still more deadly poison. M. Duchâtel of Paris found that dogs were destroyed by doses of from one twenty-fifth of a grain to one five-hundredth of a grain. We have heard of inveterate snuffers keeping this comfort open in their waistcoat pockets, and helping themselves by fingers'-full at a time ; if their snuff contained anything like the proportion of deleterious ingredients now to be found in the same article, "dropped hands" and colic would soon have cured them of this dirty and disagreeable habit.

It is not our purpose to follow further the trail which Accum and others, and more lately and particularly Dr. Hassall, have discovered for us. Before closing the pages of the latter gentleman's report, however, from which we have drawn so largely,

we cannot avoid stating that the community is under the greatest obligation to both himself and the editor of the *Lancet*—to the one for the energy with which he pursued his subject, and to the other for his singular boldness in rendering himself liable for the many actions which the publication of the names of evil-doers was likely to bring upon his journal, a liability which Dr. Hassall has since taken upon himself by the reprint of the report under his own name. This report is, in fact, as far as it goes, a handbook to the honest and fraudulent food-dealers in the metropolis; and every man who values wholesome aliment, and thinks it a duty to society to support the honest tradesman in preference to the rogue, should procure it as a valuable work of reference. We have not followed the author into personalities, as no further purpose could be served by so doing; but we have shown enough to convince the public that the grossest fraud reigns throughout the British public commissariat. Like a set of monkeys, every man's hand is seen in his neighbour's dish. The baker takes in the grocer, the grocer defrauds the publican, the publican "does" the pickle manufacturer, and the pickle-maker fleeces and poisons all the rest.*

As guardian of the revenue, the government is deeply interested in this question, independently of the view it must take of its moral aspect, for the excise is without doubt cheated to the extent of hundreds of thousands a year by the same unlawful practices which demoralize a large portion of the community, and defraud and deceive the remainder.

* An act has lately been passed which will, we trust, check in some degree the grosser food-frauds on the public.

THE ZOOLOGICAL GARDENS.

To furnish every possible link in the grand procession of organized life, is the aim of the science of zoology. Its professors have explored the wilds of Africa, and have penetrated far into the interior of South America; have endured the last extremities of hunger and thirst to catch some curious humming-bird; have been consumed by fevers to the very socket of life, in order to pin an unknown beetle, or to procure some rare and gorgeous-coloured fly. The passion for this science seems to have long dwelt in the English race: our love of field-sports, and keen relish of rural life, coupled with a habit of minute observation, have all had a tendency to foster an acquaintance with the beasts of the field and the fowls of the air, and scarcely a village but boasts of some follower of White or Waterton. This taste we carry with us to our vast colonial possessions, and to that chain of military posts whose morning guns echo round the world. With such splendid opportunities for observing and collecting animals, we have succeeded in gathering together a menagerie which is by far the first in existence, and which includes typical forms of most living things—from the chimpanzee, in whose face and structure we trace the last step but one of the highest form of mammal, to the zoophyte, which shakes hands with the vegetable world.

Ancient Rome, it is true, in her degenerate days, witnessed vaster collections of animals, and saw hippopotami, ostriches, and giraffes, together with the fiercer carnivora, turned by hundreds into the arena; but how different the spirit with which they were collected! With the debased and profligate

Roman emperors the only object of these bloody shows was to gratify the brutal appetite of their people for slaughter; with us the intention is to display the varying wonders of creation.

Most of our readers in the full flush of summer have leaned over the balustrade of the carnivora terrace. From this elevated situation the whole plan of the south side of the grounds is exposed. To his right, fringing a still pool whose translucent waters mirror them as they stand, the spectator sees the collection of storks and cranes: more immediately in front of him softly tread the llamas and alpacas—the beasts of burthen of the New World: farther, again, we see the deer in their paddocks; and beyond, the sedgy pools of the water-fowl, set in the midst of graceful shrubberies which close the Gardens in from the landscape of the Regent's Park. Passing over to the northern side of the terrace he sees the eagle aviary, tenanted by its royal and solitary-looking occupants; the otters swimming their merry round, and perchance the seal flapping beside his pool; while the monkeys, with incredible rapidity and constant chatter, swing and leap about their wire enclosure. Immediately beneath him the Polar bears pace to and fro, or, swaying their heads, walk backwards with a firmness which a lord chamberlain might study with advantage; and close at hand the long neck of the "ship of the desert" is seen sailing out from the gateway of the pretty clock-house. That the dread monarch of the forest and the other "great cats" are beneath his feet, he is made aware by angry growls and the quivering sound of shaken iron bars, as the keeper goes round with his daily beef-barrow. No one can help feeling a certain sense of strangeness at seeing these creatures of all climes scattered amid a flourishing garden—to witness beasts, ensanguined in tooth and claw, impatiently pacing to and fro between banks of scarlet geraniums or beds brilliant with the countless blooms of early dahlias—or, still more oddly, to witness birds of prey which love to career in the storm surrounded by monthly roses. Had it been possible to have given each class of bird and animal its appropriate vegetation, it

would doubtless have been preferable; but such an arrangement was manifestly impossible.

Descending from this general survey, the long row of dens which run below the terrace on either side are the first to attract the visitor's attention. Before this terrace was constructed, in 1840, the larger carnivora were cooped up in what is now the reptile-house. The early dens of the establishment form a good example of the difficulty Englishmen experience in suiting themselves to altered circumstances. On the first formation of the gardens the society seems to have taken for its model some roving menagerie, as many of the houses of the beasts were nothing better than caravans dismounted from their wheels, and the managers encamped their collection in a fashion little more permanent than Wombwell would have done upon a village green. It was speedily found that the health of the felidæ suffered materially from their close confinement, which did not even admit of the change of air experienced in the travelling caravan. In fact, the lions, tigers, leopards, and pumas, did not live on an average more than twenty-four months. To remedy this state of things the terrace dens were constructed, and, rushing from one extreme to the other, tropical animals were left exposed to the full rigour of winter. The drifting rain fell upon their hair, and they were exposed in cold, wet weather to a temperature which even man, who ranges from the torrid zone to the arctic circle, could not resist unprotected. The consequences were manifested in the increase of inflammatory lung diseases, and it is now found necessary to protect the dens by matting and artificial heat from the extreme cold and damp of the winter months. In the summer the exposure suits them admirably, and it must be confessed that the tigers look only too fat and comfortable. One of the most interesting cages is that which contains a family party, consisting of the mastiff with the lion and his mate. They were brought up together from cub-hood, and agree to a marvel; though the dog would prove little more than a mouthful for either of his noble-looking companions. Visitors express a vast deal of sympathy for him, and fancy that the lion is only saving

him up, as the giant did Jack, for a future feast. But their sympathy, we believe, is thrown away. "Lion" has always maintained the ascendancy he assumed when a pup, and any rough handling on the part of his huge playfellows is immediately resented by his flying at their noses. Although the dog is allowed to come out of the den every morning, he shows a great disinclination to leave his old friends. It is, however, thought advisable to separate them at feeding-time. Both the lion and lioness are of English birth, and it is singular that out of the great number that have been born in the society's garden full fifty per cent. have come into the world with cleft palates, and have perished in consequence of not being able to suck. If the keepers were to fill their nostrils with tow, we fancy they could accomplish this act, as well at least as children who are suffering from cold in the head. The male affords us an opportunity of showing the difference between the African variety to which he belongs and the East Indian specimen at the other end of the terrace. Our young Cape friend has a fine mane, and a tail but slightly bushed at the top, which droops towards the ground. The full-grown animal from Goojerat, is, on the contrary, comparatively maneless, and his tail takes a short curl upwards at the end. The caudal extremity of both is furnished with a rudimentary claw. This little appendage was supposed by the ancients to be instrumental in lashing the lion into fury, and Mr. Gordon Cumming informs us that the natives of South Africa believe it to be the residence of an evil spirit which never evacuates its post until death overtakes the beast and gives it notice to quit. The Goojerat or maneless lion is supposed to be the original of the heraldic beast we regard with such respect as a national emblem, but which foreigners maintain is nothing better than a leopard.

But why do we coop these noble animals in such nutshells of cages? What a miserable sight to see them pace backwards and forwards in their box-like dens! Why should they, of all the beasts of the forest, be condemned to such imprisonment? The bear has his pole, the deer his paddock, the otter his pool, where

at least they have enough liberty to keep them in health; but we stall our lions and tigers as we would oxen, till they grow lethargic, fat, and puffy, like city aldermen. With half an acre of enclosed ground, strewn with sand, we might see the king of beasts pace freely, as in his Libyan fastness, and with twenty feet of artificial rock, might witness the tiger's bound. Such an arrangement would, we are convinced, attract thousands to the gardens, and restore to the larger carnivora that place among the beasts from which they have here been so unfairly degraded. We commend this idea to the able secretary to the society, who has shown, by his system of "starring," how alive he is to the fact that it is to the sixpenny and shilling visitors who flock to the gardens by tens of thousands on holidays that he must look to support the wise and liberal expenditure he has lately adopted.

On the other side of the terrace, in addition to the leopards and hyænas, is to be found a splendid collection of bears, from the sharp-muzzled sun-bear (who robs a beehive in a hollow tree as artistically as a London thief cuts a purse) to the enormous Russian Bruin, the largest perhaps ever exhibited. "Prince Menschikoff," * as he is called by the keepers, grew into exceeding good condition in the gardens at Hull, where it appears he chiefly dieted upon his brethren, the cannibal having consumed no less than five bears; and they appear to have had the same effect upon him as cod-liver oil upon a human invalid. His neighbours, the white Polar bears, contrast with him strangely in physiognomy and form; their heads, sharp as polecats', seem fashioned, like cutwaters, to enable them to make their way in the sea; and if they would lift their huge paws, we should see that they were clothed almost entirely with hair, to aid them in securing a firm footing on the ice. The largest of these beasts managed to get out of his inclosure before the top of it was barred in; but he was peaceably led back again. Indeed, even the wildest of the beasts, after a little confinement, seem so frightened at recovering their liberty, that they easily allow themselves to be recaptured.

* Since gone to make bears' grease.

In one year the Felidæ alone consumed beef, mutton, and horse-flesh to the value of £1,367. 19*s.* 5*d.* This sum is entirely irrespective of the fish, snakes, frogs, and other "small deer" given to the birds and inferior carnivora. They all live here like gentlemen, emancipated from the drudgery of finding their daily food. They have their slaughter-houses close at hand in the gardens, where sheep, oxen, and horses are weekly killed expressly for them. Some of them will only eat cooked meat. Soon after the establishment of the gardens experiments were made as to the best manner of feeding them, which proved that, while they gained flesh and continued active upon one full meal a day, they lost weight and became drowsy on two half-meals. In the endeavour to follow nature still closer, they were dieted more sparely, and even fasted at certain seasons. This treatment, however, resulted in a catastrophe—a female leopard and puma killing and eating their companions: a strong hint for fuller rations, which was not neglected.

Let us now cross over from the cages of the king of beasts to the aviary of the king of birds. The collection of eagles, vultures, and condors, numbers upwards of twenty species, among which we recognized "the oldest inhabitant" of the Gardens—the vulture presented to the society by Mr. Brooks, the surgeon, more than thirty years ago. Notwithstanding his age, he looks one of the finest birds in the collection. We question, however, if the last new-comer of the same species will not "put his bill out," arriving as he does from a distant shore to which thousands of anxious hearts have turned. We allude to the vulture lately sent from the Crimea. He was caught near the monastery of Saint George, and the proximity of his retreat to many a battle-field suggests reflections too painful to dwell upon. The prominent impression produced in glancing at this aviary is the perfect isolation which each bird maintains as he crowns the topmost pinnacle of the heap of rocks reared in the centre of his den, where he perches, motionless as a stone. There seems to be no recognition of fellow-prisoners—no interchange of either blows or courtesies between the iron netting. Each seems an enduring captive

that will not be comforted or won over to the ways of men. Now and then unsheathing his piercing eye, we perceive the huge wings spread, and perchance remembering the callow eaglets in some Alpine eyrie, the bird soars upwards for a moment, beats his pinions against the netting, and falls to the earth again with the ignominious flop of a Christmas turkey. It is impossible to contemplate these birds without pity, not unmixed with pain. Who can recognize, in the motionless bunch of feathers before us, Audubon's magnificent description of the Bald Eagle as he swoops upon his prey?—

"The next moment the wild trumpet-like sound of a yet distant but approaching swan is heard. . . . . Now is the moment to witness a display of the eagle's powers. He glides through the air like a falling star, and like a flash of lightning comes upon the timorous quarry, which now, in agony and despair, seeks, by various manœuvres, to elude the grasp of his cruel talons. It mounts, doubles, and willingly would plunge into the stream were it not prevented by the eagle, which, long possessed of the knowledge that by such a stratagem the swan might escape him, forces it to remain in the air by attempting to strike it with its talons from beneath. The hope of escape is soon given up by the swan. It has already become much weakened, and its strength fails at the sight of the courage and swiftness of its antagonist. Its last gasp is about to escape, when the ferocious eagle strikes with his talons the under side of his wing, and with unresisted power forces the bird to fall in a slanting direction upon the nearest shore."

This is the romance of the noble bird's mode of obtaining food—here, as he marches off with a dead rat in his claw, or a piece of raw beef, we behold its prose. But however unpoetical this treatment, it cannot be said to disagree with him, as fine plumage and good condition prove. Passing on our way to the monkey-house, the merry otters are seen playing "follow-my-leader" round their rock-house, now plunging headlong in search of the flat-fish which shines at the bottom of the water—now bringing it to shore, and crushing flesh, vertebræ, and all.

The admirably-arranged but vilely-ventilated monkey-house is always a great source of attraction. The mixture of fun and solemnity, the odd attitudes and tricks, and the human expression of their countenances, all tend to attract, and at the same time to repel. Mr. Rogers used to say, that visiting them was like going to see one's poor relations; and wondrous shabby old fellows some of them appear. We have only to look into their faces for a moment to see that they differ from each other as

much as the faces of mankind. There is a large, long-haired, black-faced rascal, who looks as murderous as a Malay; a little way off we see another with great bushy whiskers and shaggy eyebrows (the mona), the very picture of a successful horse-dealer; a third, with his long nose and keen eye, has all the air of a crafty old lawyer. The contemplation of them brings involuntarily to the mind the doctrine of the transmigration of souls. The apes and baboons are indeed purely brutal, and only excite disgust: towards the latter the whole company of smaller monkeys express the utmost hatred—as may be seen when the keeper by way of fun takes one of them out of his cage and walks him down the room. The whole population rush to the front of their cages, and hoot, growl, and chatter at him as only Eastern County shareholders can do when their chairman takes his seat. The vivacious little capuchin monkeys are evidently the favourites, and bag most of the nuts; the brown capuchin appears to be particularly knowing, as he keeps a big pebble at hand, and when he finds that his teeth are not equal to the task, he taps the nut with the stone with just sufficient force to break the shell without bruising the kernel. We have often seen this little fellow take a pinch of snuff, and assiduously rub his own and his companion's skin with it, with a full knowledge, no doubt, of the old recipe for killing fleas. He will also make use of an onion for a similar purpose. Among the other quadrumana in this house we find the lemurs, which look more like long-legged weasels than monkeys, and the bright-faced little marmosets, who cluster inquiringly to the front of their cage, looking in their cap-shaped headdress of fur like so many gossips quizzing you over the window-blinds.

At the present moment there is no specimen of either the uran or chimpanzee in the Gardens, but there have been at least half a dozen located here within the last ten years, one of which, "Jenny," maintained her health for five years. The damp, cold air of the Gardens at last brought on consumption; and the public must remember the poor, wheezing, dying brute, with a plaster on her chest and blankets around her, the very picture of a moribund old man. The only specimen

now in Europe is in the Jardin des Plantes, at Paris. This animal, one of the finest ever seen, is in excellent health, and promises to maintain it in the bright air of La Belle France. An accomplished naturalist has kindly furnished us with the following particulars of this brute, which clearly indicate that he is a very Dr. Busby among his fellows :—

"He passed through London on his way to Paris, having landed at Plymouth. There were then two female Chims resident in the Gardens in the Regent's Park, and the French Chim was allowed to lodge in their hotel for a couple of nights. On his appearance both of these young ladies uttered cries of recognition, which however evinced more fear than anything else. Chim was put into a separate compartment, or room with a double grille, to prevent the probable injuries which discordant apes will inflict on each other. He had scarcely felt the floor under his feet when he began to pay attention to his countrywomen thus suddenly and unexpectedly found. Their fear and surprise gradually subsided, and they stood watching him attentively, when he broke out into a characteristic *pas seul*, which he kept up for a considerable time, uttering cries scarcely more hideous than seem the notes of a Chinese singer, and not far out of unison with his loudly-beating feet. The owner, who was present, said that he was imitating a dance of the negroes, which the animal had often seen while resident in his house in Africa. The animal was upwards of a year and a half old, and had spent one year of his life in this gentleman's house. The Chim maidens gradually relaxed their reserve as the vivacity of the dance increased, until at last, when it was over, each stealthily put a hand through the grille and welcomed their friend and brother to their home in a far land. As the weather was severe—it was early in December—it is possible that their talk was of their native palm-groves and their never-ending summer. Chim thenceforth made himself as agreeable as possible, and when the time for his departure came, the maidens exhibited the liveliest regret, short of tears, at losing him. At Paris he increased rapidly in stature and intelligence. The climate, diet (he drinks his pint of Bordeaux daily), and lively society of the French seem to be more congenial to Chim's physique than our melancholy London. He makes acquaintance not only with the staff but with the *habitués* of the Garden. The last time I saw him (May, 1854) he came out to taste the morning air in the large circular enclosure in front of the Palais des Singes, which was built for "our poor relations" by M. Thiers. Here Chim began his day by a leisurely promenade, casting pleased and thankful glances towards the sun, the beautiful sun of early summer. He had three satellites, coati-mundis, either by chance or to amuse him, and while making all manner of eyes at a young lady who supplies the Singerie with pastry and cakes, one of the coati-mundis came up stealthily behind and dealt him a small but malicious bite. Chim looked round with astonishment at this audacious outrage on his person, put his hand haughtily upon the wound, but without losing his temper in the least. He walked deliberately to the other side of the circle, and fetched a cane which he had dropped there in his promenade. He returned with majestic wrath upon his brow, mingled, I thought, with contempt; and, taking Coati by the tail, commenced punishment with his cane, administering such blows as his victim could bear without permanent injury, and applied with equal justice to the ribs on either side, in a

9712

direction always parallel to the spine. When he thought enough had been done, he disposed of Coati without moving a muscle of his countenance, by a left-handed jerk, which threw the delinquent high in air, head over heels. He came down a sadder and a better coati, and retired with shame and fear to an outer corner. Having executed this act of justice, Chim betook him to a tree. A large baboon, who had in the mean time made his appearance in the circle, thought this was a good opportunity of doing a civil thing, and accordingly mounted the tree and sat down smilingly, as baboons smile, upon the next fork. Chim slowly turned his head at this attemp tat familiarity, measured the distance, raised his hind foot, and, as composedly as he had caned the coati, kicked the big baboon off his perch into the arena below. This abasement seemed to do the baboon good, for he also retired like the coati, and took up his station on the other side. To what perfection of manners and development of thought the last year and a half may have brought him I can scarcely guess; but one day doubtless some one will say of him, as an Oriental prince once said to me, after looking at the uran 'Peter,'—'Does he speak English yet?'"

The monkeys before they were transferred to this house suffered a great mortality, and indeed, on taking possession of their new apartment, the keepers used to remove the dead by the barrowful in the morning. This extreme mortality was produced by want of ventilation, and a system of heating which burnt the air and induced inflammation of the lungs. Dr. Marshall Hall and Dr. Arnott, upon being consulted, directed the substitution of an open stove, when the deaths ceased.

As we pass towards the small building once used as the parrot-house, but now dedicated to the smaller felidæ, we go by the seal-pond, and see that strange beast which resembles a Danish carriage-dog with his legs amputated. He is an epicure as regards his regular meals, and turns up his nose at any fish less *recherché* than whiting, of which expensive delicacy he consumes ten pounds weight daily. Meanwhile, however, he is "a snapper-up of unconsidered trifles," and we see him, as the visitors circulate round his enclosure, flop, flop, around the margin of his pond, keeping a sharp look-out above the railings for stray favours. The house of the smaller carnivora is generally overlooked, but it is worthy of a visit, if only to see the beautiful clouded tigers as they are misnamed, for they more resemble hunting leopards both in size and skin-markings. These elegant creatures are quite tame, and permit the utmost familiarities of their keeper; but their neighbour, the caracal or lynx, never seems tired of making the most ferocious rushes

at the bars, accompanied by a vindictive and incessant spitting, which impresses us with the idea that it possesses the very quintessence of catlike nature. There is one little cage in this apartment which is deserving of especial inspection—that containing a specimen of the indigenous black rat, which, according to Mr. Waterton, was entirely eaten out of the country by the grey rats of Hanover, which came over in the same ship with *Dutch William*, and which are, according to that hearty naturalist, the very emblems of "Protestant rapacity." Those who have read his delightful essays know well with what perseverance the author hunts the grey rodent through every chapter of his book.

If we now retrace our steps along the border of the plantation, which forms a deep green background for countless dahlias, and moreover screens the garden from the biting east, we shall, by turning to the right hand, come upon the Aquarium, the latest and most attractive sight in the gardens. How cool and delicious! Around us we perceive slices of the deep sea-bed and the rapid river. Were we mermen we could not examine more at ease the rich pavement of the ocean set with strange and living flowers. In the midst of the green walls of water which surround us, mimic caves, waving with sea-weed and other marine plants, afford shelter and lurking-holes for bright fish which stare and dart, or for shambling crustaceæ which creep over the pebbly bottom. Against the dark verdure of these submerged rocks, the sea-anemone rears its orange base tipped with flower-like fans, or hangs its snake-like tentacles, writhing as the head-dress of Medusa. But we must look narrowly into each nook and under every stone, if we wish to realize the amount of animal life, which here puts on such strange vegetable forms. Let us consider well for a few minutes one of the tanks running down the middle of the building. For months all the minute animal and vegetable life has been multiplying and decaying, and yet the water remains pure and bright. The explanation of this phenomenon affords one of the most beautiful examples of the manner in which nature on a grand scale holds the balance true between her powers. If we

were to put these little bright-eyed fish alive into the crystal tank, in a week's time they would die, because they would have withdrawn all the oxygen it originally contained, and contaminated it with the poisonous carbonic acid gas exhaled from their lungs. To prevent this, the philosopher hangs these mimic caves with verdant seaweed, and plants the bottom with graceful marine grasses. If the spectator looks narrowly at the latter, he finds them fringed with bright silver bells: these bells contain oxygen, which the plants have eliminated from their tissues under the action of light, having previously consumed the carbonic acid gas thrown out by the fishes and zoophytes. Thus plants and animals are indispensable to the preservation of each other's life. But even now we have not told the entire causes which produce the crystal clearness of the water. The vegetable element grows too fast, and if left to itself the sides of the tank would be covered with a confervoid growth, which would speedily obscure its inmates from our view.

We want scavengers to clear away the superfluous vegetation, and we find them in the periwinkles which we see attached by their foot-stalk to the glass. These little mollusca do their work well: Mr. Gosse, who has watched them feeding with a pocket-glass, perceived that their saw-like tongues moved backwards and forwards with a crescentic motion, and thus, as the animal advances, he leaves a slight swathe-like mark upon the glass, as the mower does upon the field. But it is clear that there are not enough labourers in the tank we are inspecting to accomplish their task, as the lobster, who comes straggling over the stones in such an ungainly manner, is more like a moving salad than any living thing, so thickly are back, tail, feelers, and claws, infested with a dense vegetable growth. A few more black mowers are imperatively called for. The fish, the weed, and the mollusc having secured to us a clear view of the inhabitants of the tank, let us inspect them one by one. Here we see the parasitic anemone. Like the old man of the sea, it fixes itself upon some poor Sinbad in the shape of a whelk, and rides about at its ease in search of food. Another

interesting variety of this zoophyte is the plumose sea-anemone, a more stay-at-home animal, which generally fixes itself upon a flat rock or an oyster-shell, and waits for the food to come to it, as your London housewife expects the butcher and baker to call in the morning.

The pure white body of the neighbouring actinia renders it more observable. Its tentacles, displayed in plumes over the central mouth, which is marked with yellow, give it the exact appearance of a chrysanthemum, and should be much in favour with the mermaids to adorn their hair. A still more extraordinary creature is the *Tabella ventilabrum*. The tube of this strange animal is perfectly straight, and its large brown silk-like radiating fans, whilst in search of food, revolve just as the old-fashioned whirling ventilators did in our windows. The instant this fan is touched it is retracted into the tube, the ends just appearing outside, and giving it the appearance of a camel's-hair brush.

We shall not attempt to describe the different species of zoophytes and annelides, amounting to hundreds—indeed, they are not all familiar to scientific men. We have little more to say of the crustacea that go scrambling about, yet it would be impossible to overlook that peripatetic whelk-shell, which climbs about the stones with such marvellous activity. On a narrower inspection we perceive that it moves by a foreign agency. Those sprawling legs protruding from its mouth discover the hermit crab, which is obliged to dress its soft body in the first defensible armour it can pick up. A deserted whelk or common spiral shell is its favourite resort, but, like many bipeds, it has a love of changing its house; and those who have narrowly watched its habits state that it will deliberately turn over the empty shells upon the beach, and, after examining them carefully with its claws, pop its body out of one habitation into another, in order to obtain the best possible fit. But there are still stranger facts connected with this intelligent little crustacean. We have before observed that the parasitic sea-anemone invariably fixes itself when possible upon this movable house, perfectly regardless of the many bumps and

rubs which necessarily fall to its lot. Another warm friend, the cloak-anemone, clings still closer, for it perfectly envelopes the lip of the shell with its living mantle. Our hermit has still a third intimate acquaintance, who sponges upon him for bed and board, in the shape of a beautiful worm, *Nereis bilineata*, which stows itself behind the crab in the attic of the whelk-shell, and, the moment its protector by his motions indicates that he has procured food, glides between the two left-foot jaws, and drags a portion of the morsel from his mouth, the crab appearing to evince no more animosity at the seizure than the Quaker who suddenly finds his spoons taken for church-rates. The interesting specimens we have dwelt upon are confined to the sea-water tanks, which line the Aquarium on the side opposite the door, and those which run down the centre of the apartment. *Vis-à-vis* are the fresh-water tanks, in which we may watch the habits of British fishes. There is a noble pike lying as still as a stone—a model sitter for the photographer who lately took his portrait. The barbel, bream, dace, and gudgeon are seen going about their daily duties as though they were at the bottom of the Thames, instead of sandwiched between two panes of glass, and inspected on either side by curious eyes. Those who go early in the morning will have a chance of seeing the lampreys hanging like leeches from the glass by their circular mouths, and breathing by the seven holes which run beside their pectoral fins. The marine fish should also be studied; strange forms with vicious-looking jaws, the dog-fish for example, which is a young fry as yet, but which will grow a yard or two in length.

At the east end of the building the alligators' pool discovers here and there a floating reptile's head, the outline of which reminds us of the hippopotamus. In both cases the habit of resting in the water with the head and body almost entirely submerged necessitates a raised form of the nostril and eye-socket, in order to allow the animal to see and breathe. A similar formation of the face is observable in the wart hog (in another portion of the gardens), which wallows up to its eyes in slush and mire. The alligators have the tank to themselves,

with the exception of a couple of turtles, which are too hard nuts for even them to crack.

The council has only established the aquarium a few years, and already it is well stocked with specimens of British zoophytes and annelides, for the most part dredged from the neighbourhood of Weymouth. If these are so beautiful, what must be the wonders of the deep sea in tropical climates? Who knows what strange things a bold adventurer might pick up who, like Schiller's diver, would penetrate the horrid depths of the whirlpool, not for the jewelled cup of the monarch, but for the hidden living treasures nature has planted there? Doubtless, among the rusty anchors and weed-clung ribs of long-lost armadas, there nestle gigantic zoophytes and enormous starfish, which would make the fortune of the Gardens in a single season. At all events, we hope to see the aquarium greatly extended, as it will afford the means of studying a department of natural history of which we have hitherto been almost wholly in the dark.

If we pursue our walk down the broad path which skirts the paddocks enclosing the deer and llamas, we cannot help being struck with the fact that the finest half of the gardens—that which is open to the setting sun—is not yet built on, whilst the more exposed portion is inconveniently crowded. The reason is, that the Commissioners of the Woods and Forests will not allow any permanent buildings to be erected on these parts, for what cause we cannot tell. We trust the prohibition will be withdrawn, and that we shall see constructed here an enclosed exercising-ground for the poor confined inhabitants of the terrace-dens. At the northern extremity of the path we have been following we come upon the paddock and pool dedicated to cranes and storks. What spectre birds have we got among? See yonder, on the very edge of the pool, the gaunt adjutant, his head muffled up in his shoulders, looking like some traveller attempting to keep his nose warm in the east wind. They say every man has his likeness among the lower animals, and we have seen plenty of adjutants waiting on a winter's night for the last omnibus. What an elegant gentleman seems the Stanley crane beside him! There is as much difference

between the two as between a young guardsman in full dress at the opera and the night cabman huddled up in the multitudinous capes of his great-coat. A third claimant for our admiration steps forward like a dancing-master, now bending low, now with the aid of his wings lifting himself on the light fantastic toe, now advancing, now poussetting, and all the time calling attention to his grotesque but not altogether inelegant attitudes by a peculiar cry. We defy the gravest spectator to watch the beautiful crowned crane at his antics without laughing. But we hear the lady beside us exclaiming, "Is it possible that the Maraboo feathers which so often gracefully sway in obeisance before the queen, were ever portions of such ugly birds as these?" Unlikely as it may seem, it is verily from these dirty ill-favoured looking Maraboo storks that this fashionable plumage is procured. Close by, sitting upon a stone, we see the melancholy-looking heron, and the audacious sparrows hop within a foot of his legs, so inanimate he seems. Ah! it is the vile deceit of the bird: in an instant he has stricken the intruder with his bill, and the next the sparrow has disappeared down his throat. That elegant grey crane is the "native companion" from Australia, so called from his love of consorting with man in that country. We all know what familiars cranes and storks are in Holland and the East, where they build on the chimney-pots without the slightest fear; and we are glad to find that they possess the same confidence in the savages of the New World. They are handsome birds, but not richly plumed as the European crane, with his black and white feathers and full-clustered tail. Once these cranes were common here, when "England was merrie England;" that is, before windmills and steam-engines were set to work to rescue many counties from a state of marsh. With civilization they utterly disappeared from the land, and with civilization we once more find them amongst us—a sight to gaze at. Not long since the odd population of this paddock embraced a secretary-bird, whose velvet breeches, white stockings, and reserved air gave him an official appearance worthy of Somerset House in the last century. Take care, little girl, how you feed them; a

charge with fixed bayonets is scarcely more formidable than the rush of sharp long bills through the railings which immediately follows a display of provisions.

A few steps take us to the magnificent aviary, 170 feet in length, constructed in 1851, through the nineteen divisions of which a pure stream of water is constantly flowing, and the space enclosed by iron netting is so spacious that the birds have room freely to use their wings. The first compartment contains two of the rarities of the gardens—the satin bower-bird and the Tallagulla or brush-turkey. The former, a bird of a shining blue-black colour, is the only remaining one of three brought to this country in 1849. Immediately upon their arriving in the gardens they commenced the construction of one of their bowers or "runs," which, according to the secretary, has been constantly added to and re-arranged from that period to the present time. The bower is, perhaps, one of the most extraordinary things in bird-architecture, as it is constructed not for the useful purpose of containing the young, but purely as a playing-place—a decorated ball-room, in fact, wherein the young couple flirt and make love previous to entering upon connubial life. The bower is constructed, in the present instance, from the twigs of an old besom, in the shape of a horse-shoe; or perhaps we should convey a better idea of it by stating that the sticks are bent into a shape like the ribs of a man-of-war, the top being open, and the length varying from six to twelve inches. Against the sides, and at the entrance of the bower, the bird, in a state of nature, places bright feathers, snail-shells, bleached bones—anything, in fact, containing colour. When it is remembered that Australia is the very paradise of parrots and gaudy-plumaged birds, it will be seen that the little artist cannot lack materials to satisfy his taste for ornament; nevertheless, we are told he goes for a considerable distance for some of his decorations. When the structure is completed, he sits in it to entice the female, fully aware, no doubt, that the fair are attracted by a handsome establishment. Be that as it may, the couple speedily commence running in and out of it, with as much sense, and probably with as much enjoyment, as light-heeled bipeds perform a galop. The consequence,

however, of the male bird being bereft of his companions, he seems careless of his bower, which is in a most forlorn condition—a ball-room, in fact, a day after a *fête*. May a new companion speedily arrive and induce him to put his house once more in order! The satin bower-bird, like the magpie, is well-known by the natives to be a terrible thief; and they always search his abode for any object they may have lost. "I myself," says Mr. Gould, in his account of these birds, "found at the entrance of one of them a small neatly-worked stone tomahawk of an inch and a half in length, together with some slips of blue cotton rags, which the birds had, doubtless, picked up at a deserted encampment of the natives."

Scarcely a less interesting bird is the brush-turkey. In appearance it is very like the common black turkey, but is not quite so large; the extraordinary manner in which its eggs are hatched constitutes its singularity. It makes no nest, in the usual acceptation of the term, but scratches decayed vegetable matter into a pyramid with its feet. It then carefully dibbles in its eggs at regular intervals, with the small end downward, and covers them over with the warm fermenting gatherings. The pair in the gardens, shortly after they were received from Australia, commenced making one of these hatching-mounds, which, by the time it was finished, contained upwards of four cart-loads of leaves and other vegetable matter. After the female had deposited sixteen eggs, each measuring not less than four inches in length—an enormous size, considering the bulk of the bird—the male began to keep watch over this natural Eccaleobion, and every now and then scratched away the rubbish to inspect them. After six weeks of burial, the eggs, in succession, and without any warning, gave up their chicks—not feeble, but full-fledged and strong: an intelligent keeper told us that he had seen one fly up out of the ground at least five feet high. At night the chicks scraped holes for themselves, and, lying down therein, were covered over by the old birds, and thus remained until morning. The extraordinary strength of the newly-hatched bird is accounted for by the size of the shell, which contains sufficient nutriment to nourish it

until it is lusty. Unfortunately, all the young but one have perished through various accidents quite independently of temperature; and the next brood will probably be reared. As both the flesh and the eggs of these birds are delicious, the council is anxious to naturalize them among us. In fact, one of the objects of the gardens, under their enlightened management, is to make it what Bacon calls in his "Atlantis," "a tryal place for beasts and fishes." For centuries a system of extermination has been adopted towards many indigenous animals; the wolf and buzzard have quite disappeared, and the eagle is fast being swept away even from the highlands of Scotland—so rapidly, indeed, that Mr. Gordon Cumming is anxious, we hear, for the formation of a society for the protection of its eggs. Noxious animals have been replaced by the acclimatization of many of the foreign fauna, which are either distinguished for their beauty or valuable for their flesh. This transfer, which adds so much to the richness of the country, can be vastly accelerated through the agency of these gardens, which are a kind of "tryal ground" for beasts, as the fields of some of our rich agriculturists are for foreign roots and grasses, in which those likely to be of service can be discovered, and afterwards distributed throughout the land.

If we may quote the brush-turkeys as instances of birds capable of affording a new kind of delicate and easily-reared food, the splendid Impegan pheasants, close at hand, bred here from a pair belonging to her Majesty, and which endure, in the open air, the rigour of winter, may be looked upon as "things of beauty," which may be produced among us to charm the eye. The elands, again, on the north side of the garden, which have bred so prolifically, and made flesh so rapidly, have been with advantage turned out into our parks, where their beautiful forms prove as attractive to the eye as their venison, of the finest quality, do to the taste.

But we can no longer tarry to speculate further on the riches of this aviary, which contains rare specimens of birds from all parts of the world. Passing along the path which takes us by the north entrance, we reach the pelicans' paddock,

in which we see half a dozen of these ungainly creatures, white and grey, with pouches beneath their bills as capacious as the bag of a lady's work-table. The visitor may sometimes have an opportunity of witnessing an explanation of the popular myth that the old bird feeds its young from the blood of its own breast. This idea evidently arose from the fact that it can only empty the contents of its pouch into the mouths of its young by pressing it against its breast, in the act of doing which the feathers often became insanguined from the blood of the mangled fish within it. The close observance of birds and beasts in zoological collections has tended to reduce many fabulous tales to sober reason. On the other side of the walk may be seen in immature plumage one of the red flamingoes from South America, which are said to simulate so closely a regiment of our soldiers, as they stand in rows fishing beside the banks of rivers; and here, too, are the delicate rose-colour specimens of the Mediterranean, which are likewise exceedingly beautiful. Those accustomed to navigate the Red Sea frequently witness vast flights of these birds passing and re-passing from Arabia to Egypt; and we are informed by a traveller that on one occasion, when he had a good opportunity of measuring the column, he convinced himself that it was upwards of a mile in length! What a splendid spectacle to see the pure eastern sky barred by this moving streak of brilliant colour!

But we have not yet explored the north side of the grounds, where the huge pachydermatous animals are lodged. The difficulty caused by the carriage-drive running between the two gardens has been vanquished by means of the tunnel, the ascent from which on the opposite side, flanked as it is with graceful ferns, is one of the most charming portions of the grounds on a hot summer's day. If after passing through the subterranean passage we turn to the right, we come immediately upon the reptile-house. Unless the visitor selects his time, he will generally find little to amuse him here. The great snakes have either retired from public life under their blankets, or lie coiled upon the branches of trees in their dens. The reptiles are offered food once a week, but will not always feed at this

interval. One huge python fasted the almost incredible time of twenty-two months, having probably prepared himself for his abstinence by a splendid gorge. After a fast of seven days, however, the majority of the serpents regain their appetites. Three o'clock is the feeding-time, and the reptiles which are on the look-out seem to know full well the errand of the man who enters with the basket, against the side of which they hear the fluttering wings of the feathered victims and the short stamp of the doomed rabbits. The keeper opens the door at the back of the den of the voluminous serpents on our right —for of these there is no fear,—takes off their blanket, and drops in upon the clattering pebbles a scampering rabbit, who hops from side to side, curious to inspect his new habitation ; presently, satisfied, he sits on his haunches and leisurely begins to wash his face. Silently the rock-snake glides over the stones, uncurling his huge folds, which, like a cable, seem to move as though by some agency from without, looks for an instant upon his unconscious victim, and the next has seized him with his cruel jaws. His constricting folds are twisted as swiftly as a whip-lash round his shrieking prey, and for ten minutes the serpent lies still, maintaining his mortal knot until his prey is dead, when, seizing him by the ears, he draws him through his vice-like grip, crushing every bone, and elongating the body preparatory to devouring it. The boa and the rock-snake always swallow their prey head foremost. How is that fine neck and delicate head to make room for that bulky rabbit? thinks the spectator. Presently he sees the jaws gape, and slowly the reptile *draws himself over*, rather than swallows, his prey, as you draw a stocking upon your leg. The huge lump descends lower and lower beneath the speckled scales, which seem to stare with distension, and the monster coils himself up once more to digest his meal in quiet. Rabbits and pigeons form the food of the pythons in these gardens. While the smaller birds are preyed upon in the reptile-house, their big brothers, the storks in the paddock, are reciprocating the law of nature by eating snakes. As we pass to the opposite side of the serpent-room, where the venomous kinds are kept, we perceive that a more cautious arrangement

is made for feeding. The door opens at the top instead of at the sides of their dens, and with good reason; for no sooner does the keeper remove with a crooked iron rod the blanket from the cobra, than the reptile springs, with inflated hood, into an S-like attitude, and darts laterally at his enemy. He seems incapable of striking well any object above or below his level: watch, for instance, that guinea-pig: again and again he dashes at it, but misses his aim; now he hits it, but only to drive the poor frightened creature with a score of flying pebbles before him: when at last he succeeds in piercing the sides of his victim, tetanic spasms immediately commence, and it dies convulsed in a few seconds. It is said by those who have watched venomous snakes, that the manner of dying exhibited by their stricken prey discloses the nature of the reptile that inflicted the poisoned wound. It is scarcely necessary to state that the popular idea that the tongue darts forth the venom is a fallacy. The poison is contained in glands which lie at the root of the fangs on either side, and, by the compression of the powerful muscles which make the head appear so broad and flat, it is forced into the fine tube which runs at the sides of the fang, and finds its exit near the point by a minute opening. The cobra at present in the collection, with its skin a glossy black and yellow, its eye black and angry, its motions agile and graceful, seems to be the very personification of India. As we watch it when ready to spring, we suddenly remember that only a film of glass stands between us and "pure death." But there is nothing to fear: the python, in the adjoining room, which weighs a hundred and twenty pounds, being incensed on his first arrival at being removed from his box, darted with all his force at a spectator. Yet the pane of glass had strength enough to bring him up, and he fell back so bruised about the head and muzzle by the collision, that he could not feed well for several months. The cobra that we see is the same that destroyed its keeper. In a fit of drunkenness, the man, against express orders, took the reptile out, and, placing its head inside his waistcoat, allowed it to glide round his body. When it had emerged from under his clothes from the other side, apparently

in good humour, he squeezed its tail, when it struck him between his eyes; in twenty minutes his consciousness was gone, and in less than three hours he was dead. Before we leave this reptile-room, let us peep for a moment into the little apartment opening from the corner, where, hanging from the wall, we see all the cast-off dresses of the serpents. If the keeper will allow us to handle one of them for a moment, we shall see that it is indeed an entire suit of light-brown colour and of gauzy texture, which covered not only the body and head, but the very eyeballs of the wearer.

The Python-house on the other side of the Museum contains two enormous serpents. The adventures of one of them—the *Python reticulatus*—deserve to be written: when small enough to be placed in the pocket, he was, with a companion now no more, taken from Ceylon to Brazil by American sailors; they were then exhibited in most of the maritime towns of South America, and were publicly sold for a high price at Callao to the captain of a ship, who brought them to the gardens, and demanded £600 for the pair; fully persuaded of their enormous value, he had paid £30 to insure them on the voyage, and it was not until he had long and painfully cogitated that he agreed to sell them for £40. We have before referred to the extraordinary length of time a python has been known to fast without injury. Their fancies as well as their fastings are rather eccentric. Every one has heard of the snake which swallowed his blanket, a meal which ultimately killed him. A python who had lived for years in a friendly manner with a brother nearly as large as himself, was found one morning solus. As the cage was secure, the keepers were puzzled to know how the serpent had escaped: at last it was observed that the remaining inmate had swollen remarkably during the night, when the horrid fact became plain enough; the fratricide had succeeded in swallowing the entire person of his brother; it was his last meal, however, for in some months he died. A friend informs us that he once saw in these gardens a rat-snake of Ceylon devour a common *Coluber natrix*. The rat-snake, however, had not taken the measure of his victim, as by

no effort could he dispose of the last four inches of his tail, which stuck out rather jauntily from the side of his mouth, with very much the look of a cigar. After a quarter of an hour, the tail began to exhibit a retrograde motion, and the swallowed snake was disgorged, nothing the worse for his living sepulchre, with the exception of the wound made by his partner when first he seized him. The ant-eater, who lately inhabited the room leading out of the python apartment, has died of a want of ants.

As we issue again into the open air, we have before us the whole length of the avenue, arched with lime-trees, in summer a veritable isle of verdure. What a charming picture it used to be to see the docile elephant pacing towards us with ponderous and majestic steps, whilst, in the scarlet howdha, happy children swayed from side to side as she marched. She, who was our delight for so many years, died some time since of a storm of thunder and lightning. Such indeed was what may seem at first the singular verdict of the medical man who made his *post mortem*. The terror, however, inspired by the storm appears to have produced some nervous disease, under which she succumbed. There is a suspicion that the carcase, five thousand pounds and upwards in weight, which was disposed of to the nackers, ultimately found its way to the sausage-makers. Do not start, good reader; elephant's flesh is considered excellent eating by the tribes of South Africa, and the lion-slayer tells us that the feet are a true delicacy. He used to eat them as we do Stilton cheese, scooping out the interior and leaving the rind; he exhibited to his audience some of these relics, which looked like huge leather fire-buckets. And now we have only the young animal left, that once sucked his huge mother, to the delight of the crowd of children, and to the disgust of the rhinoceros, who is the sworn enemy to all elephants. The little one is growing apace, however, and has already been promoted to carry the long-deserted howdha. The rhinoceros, close at hand, is the successor of the fine old fellow purchased in 1836 for 1,050*l.*, the largest sum ever given by the society for a single animal. The specimen now in the gardens cost only

350*l.* in 1850, so much do these commodities fluctuate in value. His predecessor, who departed this life full of years, was constantly forced upon his belly by a pugnacious elephant, who pressed his tusks upon the back of his neighbour when he came near the palings which separated their inclosures. This rough treatment appears to have led to his death, as Professor Owen found, on dissecting the massive brute, which weighed upwards of two tons, that the seventh rib had been fractured at the bend near the vertebral end, and had wounded the left lung.

Not far from the picturesque house built by Decimus Burton, in one of the cages fronting the office of the superintendent of the gardens, is to be seen a beaver. The wonderful instinct of this little animal is certainly not inferior to that of the huge elephant. As yet he has not been placed in circumstances to enable the public to witness his building capacities; but it is the intention, we understand, of the Council to give him a stream of running water and the requisite materials to construct one of those extraordinary dams for which this animal is so famous. In Canada, where he used to flourish, the backwoodsmen often came upon hill-sides completely cleared of good-sized trees by colonies of these little creatures, who employed the felled timber to construct their dams—dams, not of a few feet in length, but sometimes of a hundred and fifty feet, built according to the best engineering formula for resisting the pressure of water, namely, in an angle with its apex pointed up the stream, and gradually narrowing from base to summit. In short, Mr. Brunel himself could not outdo your beaver in his engineering operations. Even in confinement this sagacious Rodent loves to display his skill, as we may learn from Mr. Broderip's account of his pet Binney:—

"Its building instinct," says that accomplished naturalist, "showed itself immediately it was let out of its cage, and materials were placed in its way, and this before it had been a week in its new quarters. Its strength, even before it was half-grown, was great, it would drag along a large sweeping-brush, or a warming-pan, grasping the handle with its teeth, so that the load came over its shoulder, and advancing in an oblique direction till it arrived at the part where it wished to place it. The long and large materials were always taken first; and two of the longest were generally laid crosswise, with one of the ends of each touching the wall,

and their other ends projecting out into the room. The area caused by the cross-brushes and the wall he would fill up with hand-brushes, rush baskets, books, boots, sticks, cloths, dried turf, or anything portable. As the work grew high, he supported himself on his tail, which propped him up admirably; and he would often, after laying on one of his building materials, sit up over against it, appearing to consider his work, or, as the country people say, 'judge it.' This pause was sometimes followed by changing the position of the materials, and sometimes they were left in their place. After he had piled up his materials in one part of the room (for he generally chose the same place), he proceeded to wall up the space between the feet of a chest of drawers which stood at a little distance from it, high enough on its legs to make the bottom a roof for him, using for this purpose dried turf and sticks, which he laid very even, and filling up the interstices with bits of coal, hay, cloth, or anything he could pick up; the last place he seemed to appropriate for his dwelling, the former work seemed to be intended for a dam. When he had walled up the space between the feet of the chest of drawers, he proceeded to carry in sticks, cloths, hay, cotton, and to make a nest; and when he had done, he would sit up under the drawers, and comb himself with the nails of his hind feet."

Well done, Binney! If the beaver in the garden will only work out his natural instincts as perfectly, we may expect some amusement. Up to a late period the beaver had become rather a scarce animal, the exigencies of fashion having nearly exterminated him. When silk hats came in, however, the annual slaughter of hundreds of thousands of his race, for the sake of the fur, gradually slackened, and now he is beginning to increase in his native retreats,—a singular instance this of the fashions of Paris and London affecting the very existence of a prolific race of animals in the New World! In the very next compartment is a hare, who for years played the tambourine in the streets of the metropolis, but his master, finding that his performances did not draw, exchanged him at these gardens for a monkey; and now, whilst he eats his greens in peace, poor Jacko, in a red cloak and a feathered cap, has probably to earn his daily bread by mimicking humanity on the top of a barrel-organ. But the hippopotamus surges into his bath in the inclosure as we pause, and there is a rush of visitors to see the mighty brute performing his ablutions. He no longer gives audience to all the fair and fashionable folks of the town. Alas for the greatness of this world! the soldier-crab and the Esop prawn now draw better "houses." Whether or no this desertion has embittered his temper, we cannot say, but he has certainly lost his amiability, notwithstanding that he still

retains the humorous curl-up of the corners of his mouth which Doyle used to hit off so inimitably. At times, indeed, he is perfectly furious, and his vast strength has necessitated the reconstruction of his house on a much stronger plan. Those only who have seen him rush with extended jaws at the massive oaken door of his apartment, returning again and again to the charge, and making the solid beams quiver as though they were only of inch-deal, can understand the dangerous fits which now and then are exhibited by a creature, who was so gentle, when he made his *début*, that he could not go to sleep without having his Arab keeper's feet to lay his neck upon. This affection for his nurse has undergone a great change, for, on Hamet's countryman and coadjutor, Mohammed, making his second appearance with the young female hippopotamus, Obaysch very nearly killed him in the violence of his rage. He has a peculiar dislike to the sight of working men, especially if they are employed in doing any jobs about his apartment. The smith of the establishment happening one day to be passing along the iron gallery which runs across one side of his bath, the infuriated animal leapt out of the water, at least eight feet high, and would speedily have pulled the whole construction down, had not the man run rapidly out of his sight. We trust his temper will improve when his young bride in the adjoining room is presented to him; but she is as yet but a baby behemoth, although growing fast. The enormously strong iron railings in front of his apartments are essential to guard against the rushes he sometimes makes at persons he does not like. Look at that huge mouth, opened playfully to receive nic-nacs! What is a bun or a biscuit to him? Down that huge throat goes one hundred pounds weight of provender daily. Surely the dragon of Wantley had not such a gullet.

The giraffes in the adjoining apartment have been in the gardens so long that they are no longer thought a rarity; but it should be remembered that the four procured in 1835 from Khordofan by the agent of the society were, like the hippopotamus, the first ever exhibited in Europe since the days of ancient Rome. Of these only one female now remains; but very

many have been bred in the gardens, and have continued in excellent health. At the present moment three of their progeny are housed in the apartment we are entering. The finest, a male, is a noble fellow, standing nearly seventeen feet high. When he strides out into the inclosure, high up as the trees are protected by boarding, he yet manages to browse as in his African forests, and it is then that the visitor sees the full beauty of the beast, which is lost in the house. The giraffe, in spite of his mild and melancholy look, which reminds us forcibly of the camel, yet fights ferociously with his kind at certain seasons of the year. Two males once battled here so furiously that the horn of one of them was actually driven into the head of the other. Their method of fighting is very peculiar: stretching out their fore and hind legs like a rocking-horse, they use their heads, as a blacksmith would a sledge-hammer, and swinging the vertebral column in a manner calculated, one would think, to break it, they bring the full force of the horns to bear upon their antagonist's skull. The blow is severe in the extreme, and every precaution is taken to prevent these conflicts.

As we pass along a narrow corridor in which the ostriches are confined, we reach at length the last inhabitant of the garden, and the most curious creature, perhaps, which it contains. If the keeper is at hand, he will open the door of the box in which it lives, and drive out for us the bewildered-looking apteryx — the highest representative, according to Professor Owen, of the warm-blooded class of animals that lived in New Zealand previous to the advent of man. Strange and chaotic-looking as are most of the living things brought from Australia and the adjacent islands, this creature is certainly the oddest of the bird class, and is, we believe, the only one ever seen out of New Zealand. As it vainly runs into the corners and tries to hide itself from the light of day, we perceive that it is wingless and tailless; it looks, in short, like a hedgehog mounted upon the dwarfed yet powerful legs of an ostrich, whilst its long bill, which seems as though it had been borrowed from a stork, is employed when the bird leans for-

ward, to support it, just as an old man uses a stick. This strange creature seems to hold among the feathered bipeds of Polynesia a parallel position to the New Holland mole (*Ornithorhynchus paradoxicus*)—which possesses the bill and webbed feet of a duck with the claws of a land animal—among the quadrupeds. Mr. Gould remarks that nature affords an appropriate vegetation to each class of animal life. Our universal mother seems to have matched her Flora to her Fauna in this portion of the globe; at least, the paradoxical creatures we have mentioned seem in happy accord with Australian vegetation, where the stones grow outside the cherries, and the pear-shaped fruits depend from the branch with their small ends downwards! The apteryx is entirely nocturnal in its habits, pursuing its prey in the ground by smell rather than by sight; to enable it to do which, the olfactory openings are placed near the point of the beak. Thus the bird scents the worm on which it feeds far below the surface of the ground. We must not regard the apteryx as an exceptional creature, but rather as the type of a large class of birds peculiar to the islands of New Zealand, which have been destroyed, like the dodo in the Mauritius, since the arrival of man. Professor Owen, long before the apteryx arrived in England, pronounced that a single bone found in some New Zealand watercourse had belonged to a wingless, tailless bird that stood at least twelve feet high.* This scientific conjecture has lately been transformed into a certainty by the discovery of a number of bones, which demonstrate that several species of Moas once roamed among the fern-clad islands which stud the bright Polynesian ocean. These bones have been found mixed with those of the apteryx, which thus becomes linked to a race of mysterious creatures, which, it is supposed, have long passed away, although a tale is told—an American one, it is true—of an Englishman having come across a dinornis, whilst out on its

* The great merit of this inference may be judged from the circumstance that several eminent naturalists, out of an honest regard for the reputation of Professor Owen, endeavoured to prevent the publication of the paper in which, with the sure sagacity of scientific genius, he confidently announced the fact.

nocturnal rambles, and of his having fled from it with as much terror as though it had been a griffin of old.

Our walk through the gardens has only enabled us to take a cursory glance at a few of the 1,300 mammals, birds, and reptiles at present located there; but the duty of the zoologist is to dwell minutely on each. To such these gardens have, for the last twenty-six years, been a very fountain-head of information. During that time a grand procession of animal life, savage and wild, has streamed through them, and for the major part has gone to that "bourne from which no traveller returns." Let us rank them, and pass them before us :—

Quadrumana	1,069
Carnivora	1,409
Rodentia	1,025
Pachydermata	204
Ruminantia	1,098
Marsupialia	219
Reptilia	1,861
Aves	7,320

—making a total of 14,205. Out of this large number many curious animals have doubtless left no trace; but through the care of the Council, no rare specimen has died, within these five years at least, without previously sitting for his portrait. The first part of the valuable collection of coloured drawings, from the inimitable pencil of Mr. Wolf, accompanied by a description from the pen of the late Mr. Mitchell, the editor of the work, is published, under the title of "Zoological Sketches, &c.," and the others will speedily follow. The work, when completed, will be unique in the annals of zoology, both for the extreme beauty of the drawings, which may be said to daguerreotype the subjects in their most characteristic attitudes, and for the nature of the letterpress, which proves that the editor has written from the life.

This splendid collection has been got together by presents, purchase, breeding, and exchanges. Out of the 14,205 specimens, however, which have been in the possession of the society, scarcely a tithe were bought. The Queen, especially, has been most generous in her presents, and the stream of

barbaric offerings in the shape of lions, tigers, leopards, &c., which is continually flowing from tropical princes to the fair Chief of the nation, is poured into these gardens. Her Majesty evidently pays no heed to the superstition once common among the people, that a dynasty was only safe as long as the lions flourished in the royal fortress. In fact, the gardens are a convenience to our gracious monarch as well as to her subjects; for wild animals are awkward things to have in one's back premises. Neither must we overlook the reproduction which has taken place in the gardens; to such an extent, indeed, has the stock increased, that sales to a large amount are annually made. The system of exchanges which exists between the various British and continental societies helps to supply the garden with deficient specimens in place of duplicates. Very rare, and consequently expensive animals, are generally purchased. Thus, the first rhinoceros cost 1,000*l.*; the four giraffes 700*l.*, and their carriage an additional 700*l.* The elephant and calf were bought in 1851 for 800*l.*; and the hippopotamus, although a gift, was not brought home and housed at less than 1,000*l.*—a sum which he more than realized in the famous Exhibition season, when the receipts were 10,000*l.* above the previous year. The lion Albert was purchased for 140*l.*; a tiger in 1852 for 200*l.* The value of some of the smaller birds will appear, however, more startling: thus, the pair of black-necked swans were purchased for 80*l.* (they are now to be seen in the three-island pond); a pair of crowned pigeons and two maleos, 60*l.*; a pair of Victoria pigeons, 35*l.*; four mandarin ducks, 70*l.* Most of these rare birds (now in the great aviary) came from the Knowsley collection, at the sale of which, in 1851, purchases were made to the extent of 985*l.* It would be impossible from these prices, however, to judge of the present value of the animals. Take the rhinoceros, for example: the first specimen cost 1,000*l.*; the second, quite as fine a brute, only 350*l.* Lions range again from 40*l.* to 180*l.*, and tigers from 40*l.* to 200*l.* The price is generally ruled by the state of the wild-beast market, and by the intrinsic rarity of the creature. A first appearance

in Europe, of course, is likely to draw, and is therefore at the top price; but it is wonderful how demand produces supply. Let any rare animal bring a crowd to the gardens, and in a twelvemonth numbers of his brethren will be generally in the market. The ignorance displayed by some persons as to the value of well-known objects is something marvellous. We have already spoken of the sea captain who demanded 600*l.* for a pair of pythons, and at last took 40*l.*! On another occasion, an American offered the society a grisly bear for 2,000*l.*, to be delivered in the United States; and, more laughable still, a moribund walrus, which had been fed for nine weeks on salt pork and meal, was offered for the trifling sum of 700*l.*!

We could go on multiplying, *ad nauseam*, instances of this kind, but must conclude the catalogue of absurdities by stating that there is a firm belief on the part of many persons that it is the Zoological Society which has proposed the large reward, which every one has heard of, for *the* tortoiseshell Tom. "The only one ever known" has been offered accordingly at the exceedingly low figure of 250*l.* On one occasion a communication was received from some person of consideration in Thuringia, requesting to be informed of the amount of the proffered prize, which he was about to claim. This was shortly followed by a letter from another person, evidently written in a fury, cautioning the society against giving the prize to the previous writer, as he was not the breeder of the cat, but was only trying to buy it for less than its value, "in which he would never succeed so long as the true breeder lived." To prevent further applications on the behalf of growers of this unique animal, we may as well state that tortoiseshell Toms may be had in many quarters.

We have said that the value of animals depends upon the state of the wild-beast market. "Wild-beast market!" exclaims the reader; "and where can that be?" Every one knows that London can furnish anything for money; and if any lady or gentleman wants lions or tigers, there are dealers in Ratcliffe Highway and the adjacent parts, who have them on the premises, and will sell them at five minutes' notice. They

" talk as familiarly of lions as ladies do of puppy dogs;" and a gentleman who purchased a bear of one of them, lately informed us that the salesman coolly proposed that he should take him home with him in a cab! We once had occasion to visit the establishment of one of these dealers, and were shown up a ladder into a cockloft, where, hearing a bumping, and perceiving a lifting motion in a trap-door, we inquired the reason, which called forth the dry remark that it was only three lions at play in a box below. Although these men generally manage to secure their live stock in a satisfactory manner, yet accidents will occur in the best-regulated lion-stores. A wild-beast merchant, for instance, informed us that one night he was awakened by his wife, who drew his attention to a noise in the back-yard, where he had placed two lions on the previous evening. On putting his head out of the window—his room was on the ground-floor—there were the lions loose, and, with their paws on the window-sill, looking grimly in upon him. A good whip and a determined air consigned Leo to his cage again without further trouble. On another occasion this same man, hearing a noise in his back premises, found to his horror that an elephant, with his pick-lock trunk, had let out a hyæna and a nylghau from their cages, and was busy undoing the fastenings of a den full of lions! The same resolute spirit, however, soon restored order. Amateurs have not always the same courage or self-possession, and they immediately have recourse to the garden-folks to get them out of their difficulties, as a housekeeper would send to the station-house on finding a burglar secreted in his cellar. On one occasion a gentleman, who had offered a rattlesnake and its young to the gardens at a high price, sent suddenly to the superintendent to implore immediate assistance, as the said snake, with half a score venomous offspring, had escaped from their box and scattered themselves in his nursery. The possessor, to avoid worse losses, was only too glad to be rid of his guests at any pecuniary sacrifice.

We cannot close our survey without touching upon the cost of the commissariat. The slaughtered beasts appropriated to

the carnivora, we have before stated, cost in the year 1854 no less a sum than 1,367*l.* 19s. 5d. If we go through the other items of food, we shall give some notion of the expense and the variety of the banquet to which the animals daily sat down during that year. Thus we see hay figures for 912*l.* 14s.; corn, seeds, &c., 700*l.* 8s. 8d.; bread, buns, &c. (for the monkeys), 150*l.* 16s. 8d.; eggs, 87*l.* 4s. 1d. (for the ant-eater principally); milk, 69*l.* 6s. 2d.; mangold-wurzel, carrots, and turnips, 22*l.* 6s.; dog-biscuit, 135*l.* 19s. 10d. (for the bears and wolves and dogs chiefly); fish (for the otters, seal, pelicans, &c.), 214*l.* 8s. 8d.; green tares, 23*l.* 16s. 8d.; rabbits and pigeons (for the snakes), 33*l.* 13s. 2d.; rice and oil-cake, 66*l.* 15s.; sundries, including fruit, vegetables, grasshoppers, snakes, mealworms, figs, sugar, &c. (for the birds principally), 157*l.* 1s. 11d.: making a total of 3,942*l.* 8s. 3d.; a great increase on the food bill of 1853, and which was caused entirely by the advance of prices.

The pitch of excellence to which the gardens have arrived has naturally resulted in drawing the increased attention of the public towards them. We have only to contrast, for instance, the number of people who entered in the year 1848—the first in which a more liberal system of management came into play—with those who passed in in 1854, to see that the establishment flourishes under the auspices of the new management; for while in the former year only 142,456 persons passed through the turnstiles, the number had risen in the latter to 407,676. It is interesting to observe that, although an increase of full 100 per cent. took place upon the privileged and ordinary shilling visitors during that interval, yet that the reduction of the admittance-charge to sixpence on Mondays and holidays was the main cause of the gradual influx of visitors—the year 1848 showing only 60,566 admittances of these holiday-folks and working-people, to 196,278 in 1854. Here, then, we have an increase of 135,712 persons, many of whom were, no doubt, rescued, on those days at least, from the fascinations of the public-house. With all this flood of life—the greater portion of it undoubtedly belonging to the labouring-classes,—not the slightest injury has been done to the gardens. A flower or two

may have been picked, but not by that class of Englishmen who were once thought too brutal to be allowed access unwatched to any public exhibition. Every year that passes over our heads proves that such shows as these are splendid examples of the method of teaching introduced by Bell and Lancaster; that they furnish instruction of a nature which is never forgotten, and which refines at the same time that it delights.

RATS.

BOSWELL relates that the wits who assembled at the house of Sir Joshua Reynolds to hear Grainger's poem on the "Sugar-cane" read in manuscript, burst into laughter when, after much pompous blank-verse, a new paragraph commenced with the invocation—

"Now, Muse, let's sing of rats."

But if a mean topic for the bard, they are an interesting subject to the naturalist, an anxious one to the agriculturist, and of some importance to everybody. Though it was no easy matter to throw around them a halo of poetry, and to elevate them into epic dignity—a difficulty which was nowise surmounted by calling them, as Grainger subsequently did, "the whisker'd vermin race"—yet there was nothing with which they had a more serious practical connection than the "sugar-cane." It was reckoned that in Jamaica they consumed a twentieth part of the entire crop, and 30,000 were destroyed in one year in a single plantation. In fact, rats are to the earth what sparrows are to the air—universally present. Unlike their feathered analogues, we rarely see them, and consequently have little idea of the liberality with which they are distributed over every portion of the habitable globe. They swarm in myriads in the vast network of sewers under our feet, and by means of our house-drains have free access to our basements, under which they burrow; in the walls they establish a series of hidden passages; they rove beneath the floors and the roof, and thus establish themselves above, below, and beside us. In the

remote islands of the Pacific they equally abound, and are sometimes the only inhabitants. But we shall not attempt to write the universal history of the rat. It is enough if we narrate his doings in Great Britain.

There are in England two kinds of land-rats—the old English black rat, and the Norwegian or brown rat. According to Mr. Waterton, the black rat is the native and proper inhabitant of the island; the brown rat not only an interloper and exterminator, but a Whig rat—a combination which he thinks perfectly consistent. In his charming essays on Natural History he says—

"Though I am not aware that there are any minutes in the zoological archives of this country which point out to us the precise time at which this insatiate and mischievous little brute first appeared among us, still there is a tradition current in this part of the country (Yorkshire), that it actually came over in the same ship which conveyed the new dynasty to these shores. My father, who was of the first order of field naturalists, was always positive upon this point, and he maintained firmly that it did accompany the House of Hanover in its emigration from Germany to England."

Having thus given the "little brute" a bad name, he pertinaciously hunts him through the two volumes of his essays; nay, he does more, for, on account of his Whiggism, he is the only wild animal banished for ever from Waterton Hall, that happy home for all other fowls of the air and beasts of the field, against which gamekeepers wage war as vermin. In Carpenter's edition of Cuvier, however, an account is given of the brown rat, or Surmulot, which, if true, entirely disposes of this pretty account of his advent. We are there told that he originally came from Persia, where he lives in burrows, and that he did not set out on his travels until the year 1727, when an earthquake induced him to swim the Volga and enter Europe by way of Astrakan.* When once he had set foot in England, he no doubt treated his weaker brother and predecessor, the black

* The history of the migrations of the rat is involved in doubt, and none of the accounts can be relied on. Goldsmith had been assured that the Norway rat, as it is called, though it was quite unknown in that country when it established itself in England, came to us from the coast of Ireland, whither it had been carried in the ships that traded in provisions to Gibraltar."

rat, much as the Stuart dynasty was treated by the house of Hanover. Though the black rat was not himself an usurper, but rather an emigrant who took possession of an unoccupied territory, his reign is also said by some to have been contemporaneous with an earlier change in the royal line of England, for he is asserted to have come over in the train of the Conqueror. He still abounds in Normandy, and to this day is known in Wales under the name of Llyoden Ffancon—the French mouse.

Rats are no exception to the law which, Wordsworth says, prevails among "all the creatures of flood and field."

> "The good old rule,
> Sufficeth them—the simple plan,
> That they should take who have the power,
> And they should keep who can."

But the black rat has kept more than is commonly imagined. Mr. Waterton is mistaken when he adopts the popular notion that the old English breed which came in with the Conqueror is almost totally annihilated by his brown cousin. The first comer has no more been destroyed by the subsequent invader than the Celt is annihilated by the triumphant Saxon. As we find the former still holding their ground in Cornwall, Wales, and the Highlands of Scotland, so we find the black rat flourishing in certain localities. In the neighbourhood of the Tower, in Whitbread's brewery, and in the Whitechapel sugar-refineries, he still holds his own, and woe be to any brown trespasser who ventures into his precincts. The weaker animal has learnt that union is strength, and, acting in masses, they attack their powerful foe as fearlessly as a flight of swallows does a hawk; but if an equal number of the two breeds are placed together in a cage without food, the chances are that all the black rats will have disappeared before morning, and, even though well fed, the brown Brobdingnags invariably eat off the long and delicate ears of their little brethren, just as a gourmand, after a substantial meal, amuses his appetite with a wafer-biscuit.

The rapid spread of the rat is due to the fearlessness with which he will follow man and his commissariat wherever he goes.

Scarcely a ship leaves a port for a distant voyage but it takes in its complement of rats as regularly as the passengers, and in this manner the destructive little animal has not only distributed himself over the entire globe, but, like an enterprising traveller, continually passes from one country to another. The colony of four-footed depredators, which ships itself free of expense, makes, for instance, a voyage to Calcutta, whence many of the body will again go to sea, and land perhaps at some uninhabited island where the vessel may have touched for water. In this manner many a hoary old wanderer has circumnavigated the globe oftener than Captain Cook, and set his paws on twenty different shores. The rat-catcher to the East-India Company has often destroyed as many as five hundred in a ship newly arrived from Calcutta. The genuine ship-rat is a more delicate animal than the brown rat, and has so strong a resemblance to the old Norman breed, that we cannot help thinking they are intimately related. The same fine large ear, sharp nose, long tail, dark fur, and small size, characterize both, and a like antipathy exists between them and the Norwegian species. It is by no means uncommon to find distinct colonies of the two kinds in the same ship—the one confining itself to the stem, the other to the stern of the vessel. The same arrangement is often adopted in the warehouses of seaports, the ship's company generally locating themselves as near the water as possible, and the landsmen in the more inland portion of the building.

When rats have once found their way into a ship, they are secure as long as the cargo is on board, provided they can command the great necessary—water. If this is well guarded, they will resort to extraordinary expedients to procure it. In a rainy night they will come on deck to drink, and will even ascend the rigging to sip the moisture which lies in the folds of the sails. When reduced to extremities, they will attack the spirit-casks and get so drunk that they are unable to walk home. The land-rat will, in like manner, gnaw the metal tubes which in public-houses lead from the spirit-store to the tap, and is as convivial on these occasions as his nautical relation. The entire race have a quick ear for running liquid, and they

constantly eat into leaden pipes, and, much to their astonishment, receive a douche-bath in consequence. It is without doubt the difficulty of obtaining water which causes them in many cases to desert the ship the moment she touches the shore. On such occasions they get, if possible, dry-footed to land, which they generally accomplish by passing in Indian file along the mooring-rope, though, if no other passage is provided for them, they will not hesitate to swim. In the same manner they board ships from the shore, and so well are their invading habits known to sailors, that it is common upon coming into port to fill up the hawser holes, or else to run the mooring-cable through a broom, the projecting twigs of which effectually stop the ingress of these nautical quadrupeds. Their occupancy of the smaller bird-breeding islands invariably ends in their driving away the feathered inhabitants, for they plunder the nests of their eggs, and devour the young. The puffins have in this way been compelled to relinquish Puffin's Island, off the coast of Caernarvon.

The ship-rat must not be confounded with the water-rat, which is an entirely different species. The latter partakes of the habits of the beaver, and is somewhat like him in appearance. He possesses the same bluff head and long fur, in which are buried his diminutive ears. He dwells in holes in the banks of rivers, which he constructs with a land and water entrance to provide against destruction by the sudden rising of the stream. This animal lives entirely upon vegetable food, which he will now and then seek at some distance inland, and we suspect that to him may be traced many of the devastations in the fruit and vegetable gardens for which the poor sparrows get the blame. We have seen water-rats cross a wide meadow, climb the stalks of the dwarf beans, and, after detaching the pods with their teeth, shell their contents in the most workmanlike manner. They will mount vines and feed on the grapes; and a friend informs us that on one occasion he saw a water-rat go up a ladder which was resting against a plum-tree, and attack the fruit. If a garden is near the haunts of water-rats, it is necessary to watch narrowly for the holes underneath the walls, for

they will burrow under the foundation with all the vigour of sappers and miners. Such is the cunning with which they drive their shafts, that they will ascend beneath a stack of wood, a heap of stones, or any other object which will conceal the passage by which they obtain an entrance. The water-rat is, however, a rare animal compared with its first-cousin, the common brown or Norway rat, which is likewise, as Lord Bacon says of the ant, "a shrewd thing in a garden." They select, according to Cobbett, the prime of the dessert—melons, strawberries, grapes, and wall-fruit; and though they do but taste of each, it is not, as he remarks, very pleasant to eat after them. Not many years since they existed in millions in the drains and sewers of the metropolis. Several causes have been in operation to diminish their numbers, and in some quarters of the town almost wholly to extinguish them. In the first place, the method of flushing the sewers lately adopted is exceedingly fatal to them. When the sluices are opened, go they must with the rush of waters, and they may be seen shot out by hundreds from the mouths of the culverts in the Thames. The fact that rats are worth three shillings a dozen for sporting purposes proves, however, the most certain means of their destruction, for it insures their ceaseless pursuit by the great hunter, man. The underground city of sewers becomes one vast hunting-ground, in which men regularly gain a livelihood by capturing them. Before entering the subterraneous world, the associates generally plan what routes they will take, and at what point they will meet, possibly with the idea of driving their prey towards a central spot. They go in couples, each man carrying a lighted candle with a tin reflector, a bag, a sieve, and a spade; the spade and sieve being used for examining any deposit which promises to contain some article of value. The moment the rat sees the light, he runs along the sides of the drain just above the line of the sewage water; the men follow, and speedily overtake the winded animal, which no sooner finds his pursuers gaining upon him, than he sets up a shrill squeak, in the midst of which he is seized with the bare hand behind the ears, and deposited in the bag. In this manner a dozen will sometimes be captured in as

many minutes. When driven to bay at the end of a blind sewer, they will often fly at the boots of their pursuers in a most determined manner.

The favourite stronghold of the rat is that portion of the house-drain which opens at right angles into the main sewer. Here he sits like a sentinel, and in security watches with his keen but astonished eyes the extraordinary apparition running with a light. It is a remarkable fact that most untrapped house-drains are inhabited by their own particular rats, and woe be to the intruder who ventures to interfere with those in possession. The rat as well as the cat may thus be classed among the domestic animals of the household, who acts as a kind of preventive puss in keeping out the whole underground community of vermin, which otherwise would have the run of our basements.

These vermin congregate thickest in the neighbourhood of slaughter-houses, or, in other words, where food is most plentiful. They are frequently found sitting in clusters on the ledge formed by the invert of the sewers. As the scavengers of drains, they undoubtedly do good service, but it is a poor set-off for the mischief they perpetrate in destroying the brick-work of the sewers—burrowing in every direction, and thus constructing lateral cesspools, the contents of which permeate the ground and filter into the wells. In making these excavations, moreover, they invariably transfer the earth to the main sewers, and form obstructions to the flow. The accumulations of their paw-work have regularly to be removed in small trucks constructed for the purpose, and if this precaution were not taken, they would in a few years entirely destroy the vast system of subterranean culverts which have been laboriously constructed at the expense of millions. The pipe-drains with smooth barrels, which the rat's tooth cannot touch, alone baffle him; indeed, the rapid flow of water in their narrow channel prevents his even retaining his footing in them. In revenge for thus being circumvented, he has in many cases entirely ruined the newly-laid channel of pipes by burrowing under them, and causing them to dip and open at the joints.

In France the sewer authorities hold an annual hunting-match, on which occasion there is a grand capture of rats; these animals are not destined to afford sport to the "fancy" under the tender manipulations of a dog "Billy;" on the contrary, our neighbours have too much respect for the integrity of his hide. We are informed that they have established a company in Paris, upon the Hudson's Bay principle, to buy up all the rats of the country for the sake of their skin. The soft nap of the fur when dressed is of the most beautiful texture, far exceeding in delicacy that of the beaver, and the hatters consequently use it as a substitute. The hide is employed to make the thumbs of the best gloves, its elasticity and texture rendering it preferable to kid.

Parent Duchâtelet collected several particulars of the rats which in his day frequented the knackers' yards at Montfaucon. Attracted by the abundance of animal food, they increased so enormously that the surrounding inhabitants, hearing that the government intended to remove these establishments, were seized with apprehension lest the vermin, when deprived of their larder, should spread through the neighbourhood, and, like a flight of locusts, swallow up everything. The alarmists may even have feared lest they should meet with a similar fate to that of the Archbishop of Mayence, who, if old chronicles are to be believed, retired to a tower in one of the isles of the Rhine to escape being devoured by a host of these creatures whose appetites were set upon him, and who, pertinaciously pursuing him to his retreat, succeeded in eating him up at last. The report of the Commission instituted to inquire into the circumstances of the Montfaucon case, showed that the apprehensions of serious damage were by no means unfounded.

"If the carcases of dead horses be thrown during the day in a corner, the next morning they will be found stripped of their flesh. An old proprietor of one of the slaughter-houses had a certain space of ground entirely surrounded by walls, with holes only large enough for the ingress and egress of rats. Within this inclosure he left the carcases of two or three horses; and when night came, he went quietly with his workmen, stopped up the holes, and then entered into the inclosure, with a stick in one hand and a lighted torch in the other. The animals covered the ground so thickly that a blow struck anywhere did execution. By repeating the

process after intervals of a few days, he killed 16,050 rats in the space of one month, and 2,650 in a single night. They have burrowed under all the walls and buildings in the neighbourhood; and it is only by such precautions as putting broken glass bottles round the foundation of a house attached to the establishment, that the proprietor is able to preserve it. All the neighbouring fields are excavated by them; and it is not unusual for the earth to give way and leave these subterraneous works exposed. In severe frost, when it becomes impossible to cut up the bodies of the horses, and when the fragments of flesh are almost too hard for the rats to feed upon, they enter the body and devour the flesh from the inside, so that, when the thaw comes, the workmen find nothing below the skin but a skeleton, better cleared of its flesh than if it had been done by the most skilful operator. Their ferocity, as well as their voracity, surpasses anything that can be imagined. M. Majendie placed a dozen rats in a box in order to try some experiments; when he reached home and opened the box, there were but three remaining; these had devoured the rest, and had only left their bodies and tails."

We have been informed that these rats regularly marched in troops in search of water in the dusk of the evening, and that they have often been met in single file stealing beside the walls that lined the road to their drinking-place. As the pavement in Paris overhangs the gutters, the rats take advantage of this covered way to creep in safety from street to street. Their migratory habits are well known, and every neighbourhood has its tale of their travels. Mr. Jesse relates an anecdote, communicated to him by a Sussex clergyman, which tends to prove that the old English rat at least shows a consideration and care for its elders on the march which is worthy of human philanthropy. "Walking out in some meadows one evening, he observed a great number of rats migrating from one place to another. He stood perfectly still, and the whole assemblage passed close to him. His astonishment, however, was great when he saw amongst the number an old blind rat, which held a piece of stick at one end in its mouth, while another had hold of the other end of it, and thus conducted its blind companion." A kindred circumstance was witnessed in 1757 by Mr. Purdew, a surgeon's mate on board the *Lancaster*. Lying awake one evening in his berth, he saw a rat enter, look cautiously round, and retire. He soon returned leading a second rat, who appeared to be blind, by the ear. A third rat joined them shortly afterwards, and assisted the original conductor in picking up fragments of biscuit and placing them before their infirm parent, as the blind old patriarch

was supposed to be. It is only when tormented by hunger that they appear to lose their fellow-feeling and to prey upon one another.

The sagacity of the rat in the pursuit of food is so great, that we almost wonder at the small amount of its cerebral development. Indeed, he is so cunning, and works occasionally with such human ingenuity, that accounts which are perfectly correct are sometimes received as mere fables. Incredible as the story may appear of their removing hens' eggs by one fellow lying on his back and grasping tightly his ovoid burden with his fore-paws, whilst his comrades drag him away by the tail, we have no reason to disbelieve it, knowing as we do that they will carry eggs from the bottom to the top of a house, lifting them from stair to stair, the first rat pushing them up on its hind and the second lifting them with its fore legs. They will extract the cotton from a flask of Florence oil, dipping in their long tails, and repeating the manœuvre until they have consumed every drop. We have found lumps of sugar in deep drawers at a distance of thirty feet from the place where the petty larceny was committed: and a friend saw a rat mount a table on which a drum of figs was placed, and straightway tip it over, scattering its contents on the floor beneath, where a score of his expectant brethren sat watching for the windfall. His instinct is no less shown in the selection of suitable food. He attacks the portion of the elephant's tusks that abounds with animal oil, in preference to that which contains phosphate of lime; and the rat-gnawn ivory is selected by the turner as fitted for billiard-balls and other articles where the qualities of elasticity and transparency are required. Thus, the tooth-print of this little animal serves as a distinguishing mark of excellence in a precious material devoted to the decorative arts. The rat does not confine himself to inert substances: when he is hard pressed for food, he will attack anything weaker than himself. Frogs, Goldsmith says, had been introduced into Ireland some considerable time before the brown rat, and had multiplied abundantly, but they were pursued in their marshes by this indefatigable hunter, and eaten clean from off the Emerald Isle.

He does not scruple to assault domestic poultry; though a rat which attempted to capture the chicken of a game-fowl was killed by the mother with beak and spur in the course of twelve minutes. The hen seized it by the neck, shook it violently, put out an eye, and plainly showed that the fowl in a conflict would be the more powerful of the two, if he was only equally daring. The number of young ducks which the rats destroyed in the Zoological Gardens rendered it necessary to surround the pools with a wire rat-fencing, which half-way up has a pipe of wire-work, the circle of which is not complete by several inches in the under part, and the rat, unable to crawl along the concave roof which stops his onward path, is compelled to return discomfited.

The rats have been for a long time the pests of these gardens, attracted by the presence of large quantities of food. The grating under one of the tigers' dens is eaten through by this nimble-toothed burglar, who makes as light of copper wire as of leaden pipes. Immediately upon the construction of the new monkey-house, they took possession, and eat through the floors in every direction to get at poor Jacko's bread. Vigorous measures were taken to exclude them; the floors were filled in with concrete, and the open roof was ceiled; but they quickly penetrated through the plaster of the latter, as may be seen by the holes to this day. They burrowed in the old inclosure of the wombat till the ground was quite rotten; and they still march about the den of the rhinoceros and scamper over his impregnable hide. It is only by constantly hunting them with terriers that they can be kept down; and as many as a hundred in a fortnight are often despatched, their carcases being handed over to the vultures and eagles. Many of them seek in the daytime a securer retreat. They have frequently been seen at evening swimming in companies across the canal to forage in the gardens through the night, and in the morning they returned to their permanent quarters by the same route.

The proprietors of the bonded-wheat warehouses on the banks of the Thames are forced to take the utmost precautions against the entrance of these depredators; otherwise, they would troop

in myriads from the sewers and waterside premises, and, as they are undoubtedly in the habit of communicating among their friends the whereabouts of any extraordinary supplies, they would go on increasing day by day as the report of the good news spread through rat-land. To repel their attentions, the wooden floors and the under parts of the doors of the granaries are lined with sheet-iron, and the foundations are sometimes set in concrete mixed with glass—matters too hard for even their teeth to discuss.

Country rats in the summer take to the fields, and create enormous havoc among the standing corn. They nibble off the ears of wheat, and carry them to their runs and burrows, where large stores have been found hoarded up with all the forethought of the dormouse. Farmers are often puzzled to account for the presence of rats in wheat stacks which have been placed upon the most cunningly-contrived stands. The fact is, these animals are tossed up with the sheaves to the rick, where they increase and multiply at their leisure, and frequently to such an extent, that a rick, seeming fair on the outside, is little better than a huge rat-pie.

The propensity of the rat to gnaw must not be attributed altogether to a reckless determination to overcome impediments. The never-ceasing action of his teeth is not a pastime, but a necessity of his existence. The writer of an interesting paper on rats in *Bentley's Miscellany* has explained so clearly the dentistry of the tribe, that we extract his account:—

"The rat has formidable weapons in the shape of four small, long, and very sharp teeth, two of which are in the upper and two in the lower jaw. These are formed in the shape of a wedge, and by the following wonderful provision of nature have always a fine, sharp, cutting edge. On examining them carefully, we find that the inner part is of a soft, ivory-like composition, which may be easily worn away, whereas the outside is composed of a glass-like enamel, which is excessively hard. The upper teeth work exactly into the under, so that the centres of the opposed teeth meet exactly in the act of gnawing; the soft part is thus being perpetually worn away, while the hard part keeps a sharp, chisel-like edge; at the same time the teeth grow up from the bottom, so that as they wear away a fresh supply is ready. The consequence of this arrangement is, that, if one of the teeth be removed, either by accident or on purpose, the opposed tooth will continue to grow upwards, and, as there is nothing to grind them away, will project from the mouth and turn upon itself; or, if it be an under-tooth, it will even

run into the skull above. There is a preparation in the museum of the Royal College of Surgeons which well illustrates this fact. It is an incisor tooth of a rat, which, from the cause above mentioned, has increased its growth upwards to such a degree, that it has formed a complete circle and a segment of another; the diameter of it is about large enough to admit a good-sized thumb. It is accompanied by the following memorandum, addressed by a Spanish priest to Sir J. Banks, who presented it to the Museum: 'I send you an extraordinary tooth of a rat. Believe me, it was found in the Nazareth garden (to which order I belong). I was present when the animal was killed, and took the tooth; I know not its virtues, nor have the natives discovered them.'"

We once saw a newly-killed rat to whom this misfortune had occurred. The tooth, which was an upper one, had in this case also formed a complete circle, and the point in winding round had passed through the lip of the animal. Thus the ceaseless working of the rat's incisors against some hard substance is necessary to keep them down, and if he did not gnaw for his subsistence, he would be compelled to gnaw to prevent his jaw being gradually locked by their rapid development.

The destructive nature of the rat, the extraordinary manner in which he multiplies, and his perpetual presence—for where there is a chink that he can fill, and food for him to eat, there he will be, notwithstanding that a long line of ancestors have one after another been destroyed on the spot*—necessitates some counteracting influence to keep him within due bounds. This is done by making him the prey of hunting-animals and reptiles, beginning with man, and running down the chain of organized life to the gliding snake. The poor rat, although he doubtless does service as a scavenger, and must have his use in fulfilling some essential purpose of creation, finds favour nowhere: every man's hand, nearly every feline paw, and many birds' beaks are against him. The world thinks of him, as of the pauper boy in "Oliver Twist,"—"Hit him hard; he ain't a'got no friends." Dwelling in the midst of alarms, he might be supposed to pass an uneasy and nervous existence. But it is nothing of the kind. The same Providence which has fur-

* When the atmospheric railway to Epsom was at work, the rats came for the grease which was used to make the endless leather valve, which ran on the top of the suction-pipe, air-tight. Some of them entered the tube, from which they were sucked with every passing train; nevertheless, day by day, others were immolated in the same manner.

nished him with the teeth suitable to the work they have to perform, has endowed him with the feelings proper to his lot; and no animal, if he be watched from a distance, appears more happy and complacent. In danger he preserves a wonderful presence of mind, and acts upon the principle that while there is life there is hope. His cunning on such occasions is often remarkable, and evinces a reasoning power of no contemptible order :—

"A traveller in Ceylon," says Mrs. Lee, in her entertaining "Anecdotes of Animals," "saw his dogs set upon a rat, and, making them relinquish it, he took it up by the tail, the dogs leaping after it the whole time. He carried it into his dining-room, to examine it by the light of the lamp, during the whole of which period it remained as if it were dead,—limbs hanging, and not a muscle moving. After five minutes he threw it among the dogs, who were still in a state of great excitement, and, to the astonishment of all present, it suddenly jumped upon its legs, and ran away so fast that it baffled all its pursuers."

The sagacity of the rat in eluding danger is not less than his craftiness in dealing with it when it comes. A gentleman, Mr. Jesse relates, who fed his own pointers, observed through a hole in the door a number of rats eating from the trough with his dogs, who did not attempt to molest them. Resolving to shoot the intruders, he next day put the food, but kept out the dogs. Not a rat came to taste. He saw them peering from their holes, but they were too well versed in human nature to venture forth without the protection of their canine guard. After half an hour the pointers were let in, when the rats forthwith joined their hosts, and dined with them as usual. If it comes to the worst, and the rat is driven to bay, he will fight with admirable resolution. A good-sized sewer-rat has been known to daunt for a moment the most courageous bull-terrier, advancing towards him with tail erect, and inflicting wounds of the most desperate nature. The bite of any rat is severe, and that of a sewer-rat so highly dangerous, that valuable dogs are rarely allowed by their masters to fight them. The garbage on which they live poisons their teeth, and renders the wounds they make deadly. Even with his great natural enemy and superior, the ferret, he will sometimes get the advantage by his steady bravery and the superiority of his tactics. Mr. Jesse

describes an encounter of the kind, the circumstances of which were related to him by a medical gentleman at Kingston :—

"Being greatly surprised that the ferret, an animal of such slow locomotive powers, should be so destructive to the rat tribe, he determined to bring both these animals fairly into the arena, in order to judge of their respective powers; and having selected a fine large and full-grown male rat and also an equally strong buck ferret, which had been accustomed to hunt rats, my friend, accompanied by his son, turned these two animals loose in a room without furniture, in which there was but one window. Immediately upon being liberated, the rat ran round the room as if searching for an exit. Not finding any means of escape, he uttered a piercing shriek, and with the most prompt decision took up his station directly under the light, thus gaining over his adversary (to use the language of other duellists) *the advantage of the sun*. The ferret now erected his head, sniffed about, and began fearlessly to push his way towards the spot where the scent of his game was strongest, facing the light in full front, and preparing himself with avidity to seize upon his prey. No sooner, however, had he approached within two feet of his watchful foe, than the rat, again uttering a loud cry, rushed at him with violence, and inflicted a severe wound on the head and neck, which was soon shown by the blood which flowed from it; the ferret seemed astonished at the attack, and retreated with evident discomfiture; while the rat, instead of following up the advantage he had gained, instantly withdrew to his former station under the window. The ferret soon recovered the shock he had sustained, and, erecting his head, once more took the field. This second rencontre was in all its progress and results an exact repetition of the former—with this exception, that, on the rush of the rat to the conflict, the ferret appeared more collected, and evidently showed an inclination to get a firm hold of his enemy; the strength of the rat, however, was very great, and he again succeeded not only in avoiding the deadly embrace of the ferret, but also in inflicting another severe wound on his neck and head. The rat a second time returned to his retreat under the window, and the ferret seemed less anxious to renew the conflict. These attacks were resumed at intervals for nearly two hours, all ending in the failure of the ferret, who was evidently fighting to a disadvantage from the light falling full on his eye whenever he approached the rat, who wisely kept his ground and never for a moment lost sight of the advantage he had gained. In order to prove whether the choice of this position depended upon accident, my friend managed to dislodge the rat, and took his own station under the window; but the moment the ferret attempted to make his approach, the rat, evidently aware of the advantage he had lost, endeavoured to creep between my friend's legs, thus losing his natural fear of man under the danger which awaited him from his more deadly foe."

Driven from his defensive position, the rat continued his attacks, but with an evident loss of courage, and the ferret ultimately came to the death-grapple with his crafty antagonist. A similar battle was witnessed by a friend, with the difference that the rat, being undisturbed in his advantageous position with regard to the light, finally beat off the ferret, which was

absolutely bitten into shreds over the head and muzzle. The repetition of the same conduct by a second animal shows that this particular species of cunning is a general faculty of the tribe. The main superiority of the ferret is in his retaining his hold when once he has fastened on his prey, sucking his life's blood the while; whereas the rat fights by a succession of single bites, which wound but do not destroy. The snake prevails by his venom. Mrs. Lee relates the particulars of a combat in Africa, in which rat and snake repeatedly closed and bit at one another, separating after each assault, and gathering up strength for a fresh attack. At length the rat fell, foamed at the mouth, swelled to a great size, and died in a few minutes.*

If he can be savage when self-protection requires, he also has his softer moments, in which he shows confidence in man almost as strong as that exhibited by the dog or cat. An old blind rat, on whose head the snows of many winters had gathered, was in the habit of sitting beside our own kitchen fire, with all the comfortable look of his enemy, the cat; and such a favourite had he become with the servants, that he was never allowed to be disturbed. He unhappily fell a victim to the sudden spring of a strange cat. A close observation of these animals entirely conquers the antipathy which is entertained towards them. Their sharp and handsome heads, their bright eyes, their intelligent look, their sleek skins, are the very reverse of repulsive; and there is positive attraction in the beautiful manner in which they sit licking their paws and washing their faces—an occupation in which they pass a considerable portion of their time. The writer on rats in *Bentley's Miscellany* relates an anecdote of a tame rat, which shows that he is capable of serving his master as well as of passing a passive

* A native in India, observing one day a rat run across the floor, stooped to look after it. While in this position he suddenly felt something tugging him back by his hair, and on putting up his hand found a large cobra struggling to free his teeth from his locks. The reptile had also observed the rat, and had dropped from the roof, when the peon suddenly interposed his person between the hunter and his prey. The snake and the rat escaped; but the magistrate of the district having ordered the house to be pulled down the next day, the cobra was found with the rat half digested in his stomach.

existence under his protection. The animal belonged to the driver of a London omnibus, who caught him as he was removing some hay. He was spared because he had the good luck to be piebald, became remarkably tame, and grew attached to the children. At night he exhibited a sense of the enjoyment of security and warmth, by stretching himself out at full length on the rug before the fire; and on cold nights, after the fire was extinguished, he would creep into his master's bed. In the daytime, however, his owner utilized him. At the word of command, "Come along, Ikey," he would jump into the ample great-coat pocket, from which he was transferred to the boot of the omnibus. Here his business was to guard the driver's dinner; and if any person attempted to make free with it, the rat would fly at them from out the straw. There was one dish alone of which he was an inefficient protector. He could never resist plum-pudding; and though he kept off all other intruders, he ate his fill of it himself. These are by no means extraordinary instances of the amiable side of rat nature when kindly treated by man, and we could fill pages with similar relations. But it seems, in addition to his other merits, that he possesses dramatic genius. We have heard of military fleas, we have seen Jacko perform his miserable imitation of humanity on the top of a barrel-organ; but who ever heard of a rat's turn for tragedy? Nevertheless, a Belgian newspaper not long since published an account of a theatrical performance by a troop of rats, which gives us a higher idea of their intellectual nature than anything else which is recorded of them. This novel company of players were dressed in the garb of men and women, walked on their hind legs, and mimicked with ludicrous exactness many of the ordinary stage effects. On one point only were they intractable. Like the young lady in the fable, who turned to a cat the moment a mouse appeared, they forgot their parts, their audience, and their manager, at the sight of the viands which were introduced in the course of the piece; and, dropping on all-fours, fell to with the native voracity of their race. The performance was concluded by their hanging in triumph their enemy the cat, and dancing round her body.

The rat, as we have said, has many enemies; the weazel, the pole-cat, the otter, the dog, the cat, and the snake hunt him remorselessly all over the world. Man, however, is his most relentless and destructive enemy. In some places he is killed for food, as in China, where dried split rats are sold as a dainty. The *chiffonniers* of Paris feed on them without reluctance. Nor is rat-pie altogether obsolete in our own country. The gipsies continue to eat such as are caught in stacks and barns, and a distinguished surgeon of our time frequently had them served up at his table. They feed chiefly upon grain; and it is merely the repulsive idea which attaches to this animal under every form that causes it to be rejected by the same man who esteems the lobster, the crab, and the shrimp a delicacy, although he knows that they are the scavengers of the sea. They were not always so nice in the navy. An old captain in her Majesty's service informs us that on one occasion, when returning from India, the vessel was infested with rats, which made great ravages among the biscuit. Jack, to compensate for his lost provisions, had all the spoilers he could kill, put into pies, and considered them an extraordinary delicacy. At the siege of Malta, when the French were hard pressed, rats fetched a dollar apiece; but the famished garrison marked their sense of the excellence of those which were delicately fed by offering a double price for every one caught in a granary. Man directs his hostility against the rat, however, chiefly because he considers him a nuisance; and the gin and poison, cold iron and the bowl, a dismal alternative, are accordingly presented to him. With the former he is not so easily caught, and will never enter a trap or touch a gin in which any of his kind have fretted and rubbed. Poison is a more effectual method, but it is not always safe. Rats which have been beguiled into partaking of arsenic instantly make for the water to quench their intolerable thirst, and, though they usually withdraw from the house, they may resort in their agony to an in-door cistern, and remain there to pollute it.* The writer who calls himself

* A single dead rat beneath a floor will render a room uninhabitable. A financier, of European celebrity, found his drawing-room intolerable. He

"Uncle James," and who, for a reason that will shortly appear, is exceedingly anxious to impress the public with the belief that the best mode of getting rid of the rat is to hunt him with terriers, states that a dairy-farmer in Limerick poisoned his calves and pigs by giving them the skim milk at which rats had drunk when under the pangs produced by arsenic. One mode of clearing them out of a house is either to singe the hair of a devoted rat, or else to dip his hind-quarters into tar, and then turn him loose, when the whole community will take their leave for a while. But this is only a temporary expedient, and in the interim the offenders are left to multiply, and perchance transfer their ravages to another part of the domain where they are equally mischievous. The same objection applies to the remedy of pounding the common dog's-tongue, when gathered in full sap, and laying it in their haunts. They retire only to return. The Germans turn the rat himself into a police-officer to warn off his burglarious brethren. Dr. Shaw, in his General Zoology, states that a gentleman who travelled through Mecklenburg about thirty years ago saw one at a post-house with a bell about its neck, which the landlord assured him had frightened away the whole of the "whiskered vermin" which previously infested the place. Mr. Neele says that at Bangkok, the Siamese capital, the people are in the habit of keeping tame rats, which walk about the room, and crawl up the legs of the inmates, who pet them as they would a dog. They are caught young, and, attaining a monstrous size by good feeding, take the place of our cats, and entirely free the house of their own kind. But the most effectual and in the end the cheapest remedy is an expert rat-catcher. Cunning as an experienced old rat becomes, he is invariably checkmated when man fairly tries a game of skill with him. The well-trained professor of the art, who by long habit has grown familiar with his adversary's haunts and tactics, his hopes and

supposed that the drains were out of order, and went to a great expense to remedy the evil. The annoyance continued, and a ratcatcher guessed the cause of the mischief. On pulling up the boards, a dead rat was discovered near the bell-wire. The bell had been rung as he was passing, and the crank had caught and strangled him.

fears, his partialities and antipathies, will clear out a house or a farmyard, where a novice would merely catch a few unwary adventurers and put the rest upon their guard. The majority of the world have, happily for themselves, a better office, and the regular practitioner might justly address the amateur in much the same words that the musician employed to Frederick the Great, when the royal flute-player was expecting to be complimented on his performance: "It would be a discredit to your Majesty to play as well as I."

"Uncle James," however, is of a different opinion. This author considers that every man should be his own rat-catcher, which he evidently believes to be the most improving, dignified, and fascinating calling under the sun, as he considers rats themselves to be the crying evil of the day, second only in his estimation to the grand injustice of the old corn-law. Indeed, we cannot see from his own premises how the evil can be second to any great destructive principle, earthquakes included. He takes a single pair of rats, and proves satisfactorily that in three years, if undisturbed, they will have thirteen litters of eight each at a birth, and that the young will begin littering again when six months old; by this calculation he increases the original pair at the end of three years to six hundred and fifty-six thousand eight hundred and eight. Calculating that ten rats eat as much in one day as a man, which we think is rather under than over the fact, the consumption of these rats would be equal "to that of sixty-four thousand six hundred and eight men the year round, and leave eight rats in the year to spare." Now, if a couple of rats could occasion such devastation in three years after the original pair marched out of the ark, how comes it that the descendants of the myriads which ages ago co-existed among us have not eaten up the earth and the fullness thereof? Uncle James conveniently forgets that animals do not multiply according to arithmetical progression, but simply in proportion to the food provided for them. He must not, however, be expected to be wiser than Malthus on the subject of animal reproduction, and he has the additional incentive to error, that he evidently paints up his horrors for an artful purpose. There

can be no sort of doubt that he has several well-bred terriers to dispose of, and hence the following panacea for all the evils which afflict society.

"A dog, to be of sound service, ought to be of six to thirteen pounds weight; over that they become too unwieldy. I would also recommend, above all others, the London rat-killing terrier: he is as hard as steel, courageous as a lion, and as handsome as a racehorse!—[Uncle James is a Londoner, of course.] Let the farmers in each parish meet and pass resolutions calling upon their representatives in parliament to take the tax off rat-killing dogs. Let them devise plans for procuring some well-bred terriers and ferrets, and spread the young ones about among their men. Let there be a reward offered of so much per head for dead rats, and let there be one person in each parish appointed to pay for the same. Rats are valuable for manure; let there be a pit in each locality, and let this man stick up an announcement every week, in some conspicuous place, as to the number of rats killed, and by whom. Then, what will be the result? Why, a spirit of emulation will rise up among the villagers, and they will be ransacking every hole and corner for rats. *Thus will a tone of cheerful enterprise, activity, and pleasantry come in among them,* 'with a fund of conversation;' and instead of that crawling, dogged monotony which characterizes their general gait and manner, they will meet their employers and go to their labour with joyous steps and smiling countenances."

The coming man, so long expected, is it seems the rat-catcher. Here is manure multiplied, agriculture improved, food husbanded, a smiling, enlightened, and conversible peasantry—and all the result of rat-catching. But a difficulty has been overlooked. When the entire population is converted into rat-catchers, rats must shortly, like the dodo, be extinct. For a while we shall become an exporting country, but this resource must fail us at last, and England's glory will expire with its rats. Then once more we shall have a sullen, silent, discontented peasantry; "their fund of conversation" will be exhausted, or at best the villagers will be reduced to talk with a sigh of the golden age, never to be renewed, when the country enjoyed the unspeakable blessing of rat-catching. In short, we fear that Uncle James has been so exclusively devoted to the science of rat-catching, that he has neglected to cultivate the inferior art of reasoning; but, interested as we suspect it to be, we join in his commendation of the virtues of the terrier. The expedition with which a clever dog will put his victims out of their misery is such that a terrier not four pounds in weight has killed four

hundred rats within two hours. By this we may estimate the destruction dealt to the race by that nimble animal, "hard as steel, courageous as a lion, and handsome as a race-horse." A custom has sprung up within the last twenty years of watching these dogs worry rats in a pit, and there are private arenas of the kind where our fair countrywomen, leaning over the cushioned circle, will witness with admiration the cleverness of their husbands' or brothers' terriers. "Uncle James" might commend their taste, and think the sport calculated to furnish them with "a fund of conversation, and a spirit of cheerful enterprise and pleasantry;" but except the fact had proved it to be otherwise, we should have supposed that there was not an educated man in Great Britain who would not have been shocked at this novel propensity of English ladies.

LUNATIC ASYLUMS.

HORACE WALPOLE, whose pen has graven so deeply the social characteristics of his age, in describing to his friend Mann the terrors excited by the Lord George Gordon mob, says "they threaten to let the lions out of the Tower, and the madmen out of Bedlam." In this short sentence we have a clear view of the opinion which our forefathers entertained of lunatics—an opinion which the pictures of Hogarth's Madhouse Cells have impressed on the popular mind even to this day. And in truth it is not fifty years since the state of things which now exists only in the imagination of the ignorant, was both general and approved. The interior of Bethlehem at that date could furnish pictures more terrible than Hogarth ever conceived. It is not our purpose, however, to dwell upon these horrors of former days. Through the instrumentality of the late Samuel Tuke, of York, Gardner Hill, Charlesworth, Winslow, and Conolly, of London, the old method of treatment, with its whips, chains, and manacles, has passed away for ever; and as a true emblem of the revolution which has taken place, we may mention that some years since a governor, in passing through the laundry of Bethlehem, perceived a wrist-manacle, which had been converted by one of the women into a stand for a flat iron!

In spite of the ameliorations in the condition of the insane, many among the higher, and nearly all among the lower classes, still look upon the County Asylum as the Bluebeard's cupboard of the neighbourhood. These unfounded ideas act as a powerful drawback to the successful treatment of insanity, for as the vast majority of cures are effected within three months of the original attack, whatever deters the friends of the patient from

bringing him under regimen at the earliest possible moment, probably ensures the perpetuation of the disease. We can well imagine the undefined awe and tribulation of spirit with which the unhappy creatures who are stricken in mind enter the gates of an abode in which they are supposed to be given over to a durance worse than death; but so mistaken is the impression, that the feelings of desperation are almost immediately succeeded by the inspiriting dawnings of hope. The furious maniac who arrives at Colney Hatch or Hanwell in a cart, or a hand-barrow, bound with ropes like a frantic animal, the terror of his friends and himself, is no sooner within the building which imagination invests with such terrors, than half his miseries cease. The ropes cut, he stands up once more free from restraint, kind words are spoken to him, he is soothed by a bath, and, if still violent, the padded room, which offers no aggravating mechanical or personal resistance, calms his fury, and sleep, which has so long been a stranger to him, visits him the first night which he spends in the dreaded asylum. An old lady—a relapsed patient—whose silver locks hung dishevelled on her shoulders, was, when we visited Hanwell, waiting in a cab in a state of the wildest excitement. Immediately she was admitted, and recognised the faces of the nurses who had formerly been kind to her, her whole countenance changed. "What, you Burke and you Thomson again!" she exclaimed, delighted at renewing former friendships; and settling herself down peaceably in the ward, she appeared as comfortable as at her own fireside.

Not only have the old methods of treatment been abandoned, but many changes have been made to render the houses for the insane less repulsive to the eye. Thousands of pounds have been spent in replacing the dungeon-like apertures (often without glass) with light-framed windows, undarkened by dismal bars; the gratings have been removed from the fireplaces; and that all the other associations may be in harmony with the improved appearance of the building, the harsh title of keeper has given place to that of attendant, and the madhouse has become the asylum. In the old plan, the entire treatment

seemed to consist in secluding the patient from every sight which renders life sweet, and in wrenching him violently from all the conditions which formerly surrounded him; the new idea is to bring within the walls as much of the outside world as possible. Here the artisan finds employment in various handicrafts, the agricultural labourer renews his commerce with the soil, and the female plies her needle or pursues her accustomed occupations in the laundry or the kitchen. Amusement takes its turn, and those who travel by the Great Western train on winter evenings are surprised to see the lights streaming from the great hall of Hanwell, and to hear perchance the sounds of music. These issue from the ball-room of the establishment! In place of the dark dungeon, the bonds and the blows which once added outward to inward woe, the inmates are realising the poetic picture of Gray,—

> "With antic Sport and blue-eyed Pleasures,
> Frisking light in frolic measures;
> Now pursuing, now retreating,
> Now in circling troops they meet:
> To brisk notes in cadence beating
> Glance their many-twinkling feet."

Mental aberration is not of necessity the bane of mental enjoyment. There are many sweets by which its bitterness may be diluted and diminished, though our ancestors were so ignorant of the fact, as to believe that the best thing to be done for a mind o'erthrown was to pour vinegar to gall.

Dr. Conolly, in his lately-published volume on "The Treatment of the Insane without Mechanical Restraint," looks upon the banishment of the strait-waistcoat with a just pride, for to him we owe the abolition of the last mechanical means of coercing temporary violence; but we cannot participate in his fear that the selfishness and ignorance of human nature will ever be able to restore the gloomy reign which has at last been brought to a close. We can no more go back to the days of hobbles and handcuffs, chains and stripes, than we can go back to the days of the rack and thumbscrew. We may have, it is true, lamentable exposures, such as took place at Bethlehem in 1851, but the depth of the public outcry, and the promptness with which

the irregularities were remedied, is of itself an evidence that general opinion will prove the corrective of occasional abuses. Nor can we, from a fancied apprehension of the return to obsolete practices, join in the fanaticism which forbids the use of the strait-jacket as a means of coercion under all circumstances. There can be no doubt that the treatment which requires its frequent use is a bad one; but to deny that there are cases which call for its restraints would be to deny the evidence of our senses. Mr. Wilkes, the late medical officer to the Stafford County Lunatic Asylum, and now Commissioner in Lunacy, in answer to a series of questions issued by the Commissioners on Lunacy upon the subject, makes the following remarks:—

"With every disposition to advocate the disuse of restraint to the utmost extent, I am compelled to admit that the result of my experience in this asylum, up to the present time, leads me to the conclusion that cases may occur in which its temporary employment may be both necessary and justifiable. Besides the occasional use of some means of confining the hands when feeding patients by means of the stomach-pump, a more prolonged use of restraint was necessary in two cases which occurred some years since. One of these was a man of so determined a suicidal disposition, that on more than one occasion he nearly effected his purpose by trying to beat his head and face against the walls, to throw himself from tables and chairs, and thrust spoons and other articles down his throat. When first admitted, he was not suspected of having any suicidal tendency, and for some weeks did not show any; as a matter of precaution he slept in a padded room, and one night he so battered his head with a tin vessel that he was found nearly dead from loss of bood, and his life was subsequently in much danger from extensive sloughing of the scalp. In this case it was absolutely necessary to confine the hands to keep any dressings on the head, and after the wounds had healed, and the confinement of the hands had been discontinued, he wore a thickly-padded cap for many months. Several years after this, he bit both his little fingers off; and though the suicidal disposition has in a great measure subsided, he is still at times much excited, but does not require any restraint. The second case was one of acute mania. A powerful young man refused all food under the impression that it was poisoned, and imagined that every one who went near him intended to murder him. Every inducement to get him to take food was in vain, and though a sufficient body of attendants, under my own inspection, attempted to do what was necessary for him, he became so much bruised in holding him in his struggles to assail the attendants, when it was urgently requisite that food should be administered into the stomach, that I decided upon confining his hands, and both food and medicine were then readily administered. The result certainly justified the means employed, as the excitement subsided, and he soon recovered."

So much for the experience of the medical attendant of a

public asylum; now let us hear the testimony of Dr. Forbes Winslow, whose experience in his private asylum, Sussex House, Hammersmith, has been as great perhaps as that of any man, since he has lived with his family for ten years in the very midst of his patients, and who is surpassed by no one in his enlightened and gentle treatment of the insane.

"Patients," he says, in his Report to the Commissioners, "have often expressed a wish to be placed under mechanical restraint, should I, in my judgment, believe that they would, when much excited, commit overt acts of violence, and be dangerous to themselves and others. In cases like these, mechanical restraint may for a short period be applied, not only without detriment, but with positive advantage as a curative process. Several instances relative of this fact have come under my observation. I have seen cases where no food or medicine could be administered without subjecting the patient to restraint. In these cases, if all idea of cure had been abandoned, and I could have reconciled it to my conscience to allow the disease to take its uninterrupted course, and have permitted the patient to exist upon the minimum amount of nutriment, and take no medicine, all restraint might easily be dispensed with; but considering the cure of my patient paramount to every other consideration, I had no hesitation as to the humane and right mode of procedure."

In a case which came under our knowledge, a patient imagined that the text, "If thine eye offend thee pluck it out," was literally intended, and, after various attempts to comply with the command, he succeeded in destroying the sight of one orbit. Such instances are rare, but the medical man should at all times be prepared to meet them, instead of folding his arms and looking helplessly on whilst the mischief is being done, through a craven fear of the non-restraint cry. The strait-waistcoat is certainly liable to great abuse, but less than the padded room, which may be converted into a cruel means of coercion in the hands of unwatched attendants.

There yet remains a vast amount of restraint, which is almost as irritating, if not so strongly reprobated, as the implements which bind the limbs of the suicidal or violent. Restraint is only comparative. The strait-waistcoat is the narrowest zone of confinement, and the padded room but a little wider. Next to these comes the locked gallery for a class, then the encircling high wall for the entire lunatic community; and lastly, that aërial barrier the parole, for those who can be trusted to go beyond the asylum. The efforts of philanthropists will not,

we are convinced, cease, until all the methods of confinement, down to the parole, are removed; or at least so disguised as to hinder their present irritating action upon the inmates. As long as the chief idea in connection with these establishments is that they are receptacles for the *detention* of the insane, so long perhaps the means taken to prevent flight will obtain; but when they are simply regarded as hospitals for the cure of mental disease, we shall witness the abandonment of many arrangements which are as barbarous and ineffectual as the cruelties practised in the last century. The asylums where the restraint is greatest are precisely those from which the largest number of patients contrive to escape; whereas, when restrictions of all kinds are abolished, as at the insane pauper colony of Gheel, in Belgium, but few persons ever attempt to get away.

In former days the public were admitted to perambulate Bedlam on the payment of twopence. A writer in the *World* gives a narrative of a visit to it in Easter-week, 1753, when he found there a hundred holiday-makers, who "were suffered unattended to run rioting up and down the wards, making sport of the miserable inhabitants." Richardson, the novelist, had, a few years earlier, depicted the scene in the assumed character of a young lady from the country, describing to her friends the sights of London.

"I have this afternoon been with my cousins to gratify the odd curiosity most people have to see Bethlehem, or Bedlam Hospital. A more affecting scene my eyes never beheld. I had the shock of seeing the late polite and ingenious Mr. —— in one of these woful chambers. No sooner did I put my face to the grate, but he leaped from his bed, and called me with frightful fervency to come into his room. The surprise affected me pretty much, and my confusion being observed by a crowd of strangers, I heard it presently whispered that I was his sweetheart and the cause of his misfortune. My cousin assured me that such fancies were frequent upon these occasions; but this accident drew so many eyes upon me as obliged me soon to quit the place. I was much at a loss to account for the behaviour of the generality of people who were looking at these miserable objects. Instead of the concern I think unavoidable at such a sight, a sort of mirth appeared on their countenances, and the distempered fancies of the miserable patients provoked mirth and loud laughter in the unthinking auditors; and the many hideous roarings and wild motions of others seemed equally entertaining to them. Nay, so shamefully inhuman were some, among whom, I am sorry to say it, were several of my own sex, as to endeavour to provoke the patients into rage to make them sport."

Supposed to be degraded to the level of beasts, as wild beasts they were treated. Like them they were shut up in dens littered with straw, exhibited for money, and made to growl and roar for the diversion of the spectators who had paid their fee. No wonder that Bedlam should have become a word of fear; no wonder that in popular estimation the bad odour of centuries should still cling to its walls, and that the stranger, tempted by curiosity to pass beneath the shadow of its dome, should enter with sickening trepidation. But now, instead of the howling madhouse his imagination may have painted it, he sees prim galleries filled with orderly persons. Scenes of cheerfulness and content meet the eye of the visitor as he is conducted along well-lit corridors, from which the bars and gratings of old have vanished. He stops, surprised and delighted, to look at the engravings of Landseer's pictures on the walls, or to admire the busts upon the brackets; he beholds tranquil persons walking around him, or watches them feeding the birds which abound in the aviaries fitted up in the depths of the ample windows. Indeed the pet animals, such as rabbits, squirrels, &c., with the verdant ferneries, render the convalescent wards of this hospital more cheerful than any we have seen in similar institutions. At intervals the monotony of the long-drawn corridors is broken by ample-sized rooms carpeted and furnished like the better class of dwellings. If we pass along the female side of the hospital, we find the apartments occupied by a score of busy workers, the majority of whom appear to be gentlewomen. Every conceivable kind of needlework is dividing their attention with the young lady who reads aloud "David Copperfield," or "Dred;" while beside the fire, perhaps, an old lady with silver locks gives a touch of domesticity to the scene, which we should little have expected to meet within these walls. In traversing the male side, instead of the workroom we find a library, in which the patients, reclining upon the sofas or lolling in arm-chairs round the fire, beguile the hours with books or the *Illustrated News*. Many a scholar, the silver chord of whose brain jingles for the moment out of tune, here finds a congenial atmosphere, and such materials for

study as he often could not obtain out-of-doors; and here many an artist, clergyman, officer, and broken-down gentleman, meets with social converse, which the world does not dream could exist in Bedlam.*

No cases of more than twelve months' standing are admitted within the walls of Bedlam, and only ninety persons termed incurables are allowed to remain beyond that period. These regulations exclude the idiotic and epileptic patients, who form such distressing groups in other establishments, and the interest required to obtain admission into this amply endowed charity ensures at the same time a much higher class of inmates. Clergymen, barristers, governesses, literary men, artists, and military and naval officers make up the staple of the assembly. The representatives of the lower orders are also present, but the educated element prevails, and the tone of dress and manners is vastly above that to be found in the pauper-swarming county asylums. There is a ball on the first Monday in every month, and the company that gathers in the crystal chamber at the extreme end of the south wing would not disgrace in behaviour and appearance any sane and well-bred community. The polka, the waltz, and the mazurka, performed with grace and ease, declare the social standing of the assembly; and many a pedestrian who sees the dark silhouettes of the dancers as they whirl across the light, is astonished at the festivities of the inmates. In the summer evenings the spacious courts are crowded with the patients, not gloomily walking between four dismal walls in which the very air seemed placed under restraint, but enjoying themselves in the bowling-green or in the skittle alley. The garden is at hand for those who love the culture of flowers. When we contrast the condition of the Bethlehem of fifty years ago with the Bethlehem of to-day, we see at a glance what a

* In a comfortable little apartment, which looked quite domestic in comparison with the workhouse wards of ordinary lunatic asylums, we saw, on our last visit, a young musician playing on a violoncello to an admiring audience. Touches of similar enjoyment continually meet the visitor, lighting up the moral atmosphere of the building with a cheerfulness totally at variance with his preconceived notions of this notorious madhouse.

gulf has been leaped in half a century—a gulf on one side of which we see man, like a demon, torturing his unfortunate fellows, on the other like a ministering angel carrying out the all-powerful law of love. Can this be the same Bethlehem where, in 1808, Mr. Westerton, Mr. Calvert, and Mr. Wakefield saw ten patients in the women's gallery, each fastened by one arm or leg to the wall, with a length of chain that only allowed them to stand up by their bench, and dressed in a filthy blanket thrown poncho-like over their otherwise naked bodies? Can this be the same institution in which poor Norris, like a fierce hound in a kennel, was favoured with a long chain that passed through the wall into the next room, and which, while permitting him a little extra tether, enabled the keeper to haul him up to the side of the cell when it was necessary to approach him? But this indulgence did not last, and from the pages of Esquirol we learn the infernal torture which was finally put upon him.

"A stout iron ring was riveted round his neck, from which a short chain passed to a ring made to slide upwards or downwards on an upright massive iron bar, more than six feet high, inserted into the wall. Round his body a strong iron bar, about two inches wide, was riveted; on each side of the bar was a circular projection, which, being fastened to and enclosing each of his arms, pinioned them close to his side."

In this position, in which he could only stand upright or lie upon his back, he lived for twelve years! But in nothing, perhaps, is the contrast between the past and the present more apparent than in the two pictures presented by Dr. Hood, the resident physician, from the case book of the Bethlehem Hospital, which at once show the difference of treatment and the different results which attended it.

"A. F., admitted into the Hospital, February 6, 1808, aged 34. This woman was born at Derby. At the age of 20 she came to London to seek for service, but she soon lost her character. The natural violence of her disposition was increased by her intemperance. She was the most turbulent of all the females that disturb the night about Fleet Market, and has been re-

"M. C., admitted into this Hospital, Sept. 30, 1853, in a state of violent raging excitement, depending upon acute mania. She had been in this state three days previous to her admission, and had wandered about the streets in a comparatively naked state, under the excitement of religious enthusiasm. She was a powerful, muscular woman; and to bring her to the Hospital it was neces-

peatedly flogged at Bridewell for her extreme violence and disorder. She became at length the horror of the watchmen, for punishing and imprisonment had no effect in checking her career. She was known to her companions by the name of 'Ginger.' In one of her paroxysms of rage she attacked the windows of the Mansion House, and on her examination before the Lord Mayor, it appeared that her violent disposition had gradually passed into a state of complete madness. Under these circumstances she was sent, February 6th, 1808, to the Hospital, and placed on the curable establishment. At the expiration of twelve months, her lunacy continuing, she was admitted on the incurable list. There is no record of the manner in which she conducted herself during the first year, but it appears *that she was chained to her bed of straw for eight years without any covering or apparel.* So long as she continued thus coerced the violence continued. The last entry is '*coercion still makes her ferocious, but when left at liberty she is not in the least degree dangerous.*'"

sary to impose upon her the restraint of a strait-jacket. She screamed violently all the way to the Hospital, and used the most threatening language, refusing to listen to anything that was said to her, but when tired of vociferating, contented herself with kicking and spitting at those within her reach. On admission, the mechanical restraint was removed; she was ordered a warm bath, and two grains of the acetate of morphia, and afterwards placed in a bed in a padded room. She continued noisy for an hour or two, and then became quieter; but the attendant, who looked at her every half-hour, always found her sleepless. The following day she continued tranquil, but when addressed, responded with an oath. She was ordered one grain and a half of acetate of morphia. The third day she continued quiet and sullen, but permitted the nurse to dress her and place her in a chair in the day-room with the other patients. The following day (the fourth) she continued tranquil and rational, rather shrinking from conversation; and being a little feverish, was ordered 'henbane,' with a saline. From that day she speedily became convalescent, and was discharged cured, November 11, 1853, having been a patient in the Hospital forty-two days."

Thus diversely does disordered nature answer to an appeal according to the spirit in which it is made. There is a reverse, however, to every medal, and the skeleton cupboards of Bethlehem are the male criminal lunatic wards. These dens, for we can call them by no softer name, are the only remaining representatives of old Bedlam. They consist of dismal, arched corridors, feebly lit at either end by a single window in double irons, and divided in the middle by gratings more like those which enclose the fiercer carnivora at the Zoological Gardens than anything we have elsewhere seen employed for the detention of afflicted humanity. Here fifty male lunatics are herded together without regard to their previous social or moral

condition. Thus the unfortunate clergyman, the Rev. Hugh Willoughby, who fired a pistol two years since at the judge at the Central Criminal Court, is herded with the plebeian perpetrator of some horrible murder. Side by side with the unfortunate Captain Johnson, of the ship "Tory," who, in a fit of extraordinary excitement during a mutiny on board his vessel, cut down some of his crew, but is now perfectly sane, sits perhaps the ruffian who murdered the warder in cold blood at Coldbath Fields—a villain brought in mad by a tender-hearted jury who shrunk from the responsibility of hanging him. Here also poor Dad, the artist, who killed his father whilst labouring under a sudden paroxysm of insanity, is obliged to weave his fine fancies on the canvas amidst the most revolting conversation and the most brutal behaviour. Those who contend that all criminal lunatics should be treated alike, do not consider the vast difference between the tone of mind in an abandoned wretch who has lived a life of villany, and the gentleman who has committed a casual offence. As the former advances towards sanity the brutal disposition, which early training in vice and dissipation has engraved upon his nature, comes into strong relief, whilst the good breeding which is natural to the latter, and which was but temporarily eclipsed in him, resumes its sway. Nay, nothing is more certain than that the previous habits and manners of the lunatic are to a great extent unaffected by his unfortunate malady, even when it is at its height. The disgrace of thus caging up together the coarse and the gentle, the virtuous and the abandoned, rests wholly upon the shoulders of the Home Secretary. The governors of the hospitals, the medical officers, and the lunacy commissioners, have over and over again remonstrated against the enormity, and to our national shame have remonstrated in vain. It is proposed to build a special asylum for all the state lunatics who are now distributed among county asylums, hospitals, licensed houses, workhouses and jails, to the number of 591,* and it is a duty which we trust will not be longer

* Steps are being taken, we believe, to effect this necessary change; but unless Parliament puts its pressure upon the Home-Office, we shall expect

delayed. There can be little doubt that the presence of these crime-tainted individuals is felt deeply by the innocent lunatics, and that their recovery is retarded by the indignation excited at their degrading companionship with the outcasts of society. The erection of a criminal asylum upon a large scale would both compel a better system of classification, and would necessitate some solution of the difficult question—What shall be done with criminal patients who have recovered? One class of cases at least, as Dr. Tyler Smith has pointed out, leaves no room for doubt. The females who have committed offences whilst under the influence of the delirium attendant upon puerperal fever, and who, having recovered, are past the age of child-bearing, should at once be released. They are no longer liable to a recurrence of mental aberration, and to keep them incarcerated for life, is to treat past misfortune as an inexpiable crime. Nothing can be more cruel, unjust, and motiveless.

It is proposed to remove Bethlehem Hospital into the country, on the plea that ground cannot be obtained in sufficient quantity for the use of the inmates. If by this is meant that agricultural pursuits cannot be carried on in St. George's Fields, we rejoice in the fact. A sane man, accustomed to the busy scene of a large town, would be wretched if he was condemned to pass the remainder of his days amid the silence of the fields, and the lunatic remains for the most part under the same domination of former habits. The notion that his faculties are universally disordered, all his perceptions destroyed, all his tastes obliterated, and all his sympathies extinct, is one of the grossest errors which can prevail. Nor do the better class of patients (such as form the inmates of Bethlehem) require the hard exercise which is necessary for the maintenance of health with an agricultural pauper. They find far more recreation in strolling through the streets in the neighbourhood of the asylum, under the care of an attendant, than in wading through ploughed fields, or in taking a turn at spade husbandry. To this we must add, that insanity is often a sudden seizure, that individuals go raving mad in the

to see the arrangement completed when the Nelson Column is finished, and not before.

streets; that, in short, there are frightful casualties of the mind, as of the body, which require the instant attention of the mental physician. For this reason alone every lunatic asylum should no more be removed into the country than every ordinary hospital. But, apart from this circumstance, we repeat that Bethlehem, within call of friends and within the hum of the busy world, glimpses of which can be caught by the patients from the loopholes of their retreat, and into which they are occasionally allowed to enter, is far better placed for purposes of cure than in any rural district, however well supplied with the means of pursuing agricultural labour. At present all the sights of the metropolis are from time to time enjoyed by the inmates. "The male patients last year," says Dr. Hood, the resident physician, "who were not fit to be discharged, were allowed to spend a day at Kew; another day they went by steamboat to the Nore; and, conducting themselves well under the charge of careful attendants, visited many public exhibitions—the National Gallery, the Crystal Palace, Marlborough House, the Zoological Gardens, Smithfield Cattle-show, &c." Who can doubt that people accustomed to such sights and sounds would infinitely prefer them to the delights of walking between hedge-rows, hoeing weeds, or digging potatoes? Who can doubt that these little excursions of the wall-bound inmates into the cheerful life of the outside world are a vast advantage to the slowly-recovering brain, and constitute just that desirable transitional training necessary to their safe restitution to unlimited freedom? In fact, under the old system, when convalescent patients, who had been confined for months in dungeon-like cells, bristling with bars, were taken to the gates and returned suddenly to unrestrained liberty, the effect of the contrast was often so great, that they set off running in a paroxysm of excitement, and were frequently brought back again in a few days, reduced by a too abrupt release to their old condition. 'It would not perhaps be undesirable to add to Bethlehem some small rural establishment, answering to the *succursales* of foreign lunatic asylums; but this should be strictly an appendage, to which patients should be sent for a short time, for change of air and scene, just

as all the world now and then take a trip to the country to refresh the wearied eye with the sight of green trees and fields, and to cure that moral scurvy contracted by perpetually dwelling upon the dismal vistas of blackened bricks which constitute metropolitan prospects.

For the fullest development of the prevalent system of treating the insane we must go to Colney Hatch and Hanwell, the two great lunatic asylums for the county of Middlesex. The former, situated on the Great Northern Railway, only six miles from the metropolis, is the largest and perhaps the most imposing-looking non-metropolitan building of the kind in Europe. In this establishment, built within the last six years, we may study the merits and demerits of modern asylums. Containing within its walls a population, inclusive of officers and attendants, of 1,380 persons, which is equal to that of our largest villages, and presenting the appearance of a town, its wards and passages amounting in the aggregate to the length of six miles, it is here that we shall find the completest system of organization, and, if we may use the term, of official routine. The enormous sum of money expended upon Colney Hatch, which has reached already to £270,000, prepares us for the almost palatial character of its elevation. Its *façade*, of nearly a third of a mile, is broken at intervals by Italian campaniles and cupolas; and the whole aspect of the exterior leads the visitor to expect an interior of commensurate pretensions. He no sooner crosses the threshold, however, than the scene changes. As he passes along the corridor, which runs from end to end of the building, he is oppressed with the gloom; the little light admitted by the loop-holed windows is absorbed by the inky asphalte paving, and, coupled with the low vaulting of the ceiling, gives a stifling feeling and a sense of detention as in a prison. The staircases scarcely equal those of a workhouse; plaster there is none, and a coat of paint or whitewash does not even conceal the rugged surface of the brickwork. In the wards a similar state of things exists: airy and spacious they are, without doubt; but of human interest they possess nothing. Upwards of a quarter of a million has been squandered principally upon the exterior of this building;

but not a sixpence can be spared to adorn the walls within with picture, bust, or even the commonest cottage decoration. This is the vice which pervades the majority of county asylums lately erected. The visiting justices doubtless believe that it would be a superfluous and even mischievous refinement to trouble themselves about pleasing the eye or amusing the brain of the lunatic; but this is a mighty error, as every person knows who understands how keenly sensitive are the minds of the majority of the insane.

> "Stone walls do not a prison make,
> Nor iron bars a cage,"

sings the graceful Lovelace; but it should be remembered that the lunatic has no divine Althea to muse upon in his house of detention, and the majority of the insane have no healthy wings by which their minds can leap beyond the dreariness of the present. To divert them from the demon in possession, all the ingenuity of philanthropy should be employed; but this truth has been overlooked both here and at Hanwell; and we are lost in astonishment when we reflect upon the folly of lavishing hundreds of thousands upon outward ornamentation, whilst the decorations common among the poorest labourers are denied to the inmates for whom all this expense has been incurred. There is no more touching sight at Colney Hatch than to notice the manner in which the female lunatics have endeavoured to diversify the monotonous appearance of their cell-like sleeping-rooms with rag dolls, bits of shell, porcelain, or bright cloth placed symmetrically in the light of the window-sill. The love of ornament seems to dwell with them when all other mental power is lost; and they strew gay colours about them with no more sense, but with as much enjoyment, as the bower-bird of the Zoological Gardens adorns his playing-bower.* The prison

* The walls of one of the wards of Colney Hatch are decorated throughout with well-executed bas-relief pictures from Greek subjects by a patient. We are informed that the lunatics who are transferred here from the undecorated wards, enter the apartment with expressions of delight, and are particularly careful to preserve the objects of their pleasure in good condition. In some metropolitan asylums the inmates have adorned their prison-house with pieces of sculpture and pictures; and the Germans are

dress of the male patients is in keeping with the desolate walls. It is infinitely depressing, even to the visitor, to see nothing but dull grey garments; and the lunatics themselves feel degraded by a uniform dedicated to the gaol-bird. The medical officers of both this asylum and Hanwell are deeply impressed with its injurious effects, and they have long denounced it. Happily the system is confined to the men, not, however, from any benevolent feeling towards the females, but simply because gown-pieces of the same pattern cannot be procured in sufficient quantities to clothe the entire community. Among the sane, self-respect is increased by the possession of decent clothes, and the lunatic is often still more amenable to their influence. A refractory patient at Colney Hatch was in the habit of tearing his clothes into shreds. Mr. Tyerman, one of the medical officers, ordered him to be dressed in a bran-new suit. The poor man, a tailor by trade, either from a professional appreciation of the value of his new habiliments, or from being touched by this mark of attention, respected their integrity, and from that moment rapidly recovered. Before leaving the asylum he stated that he owed his cure to the good effect produced upon his mind by being intrusted with this new suit of clothes. At Hanwell, the patients who destroy their dresses are put into strong canvas garments, bound round with leather and fastened with padlocks. This plan is adopted at some other lunatic asylums; but it always looks repulsive.

It is only, we believe, in the metropolitan county asylums, which should be model establishments, that the grey prison dress is retained. In the majority of county asylums the smock-frock of the district is used, and the patient moves about undistinguished from the rest of the population by any repulsive badge. In France and Belgium they manage better still. Dr. Webster, in his notes on foreign lunatic asylums, published in the *Psychological Journal of Medicine*, speaks of the bright head-dresses and vivid shawls used in France, as giving a cheerful appearance

fond of indulging the love of colour by filling some of the windows with stained glass. In France, abundance of flowers are placed about the establishment, as being eminent sources of delight. In these particulars we have not a little to learn from our continental brethren.

to the assembled inmates. Nothing less could be expected from the known disposition of a people of whom it has been said, that if any man among them was thrown naked into the sea, he would rise up clothed from head to foot with a sword, bag-wig, and ruffles to boot. In the present matter they have been wiser in their generation than ourselves; and we can imagine with what surprise they would learn that at Hanwell, the most celebrated English establishment for the treatment of the insane, patients are rewarded for good conduct by allowing them to wear a fancy waistcoat. This fact of itself shows the aversion to the prison garb, and the necessity of discarding it. But the same visiting committee which inspects the county gaol governs the asylum, and we regret to say that they allow the organization of the former to be introduced into the latter.

In spite of these drawbacks, the progress made within the last twenty years has been immense. A walk through the wards and workshops of Colney Hatch will prove that the lunatic is at last treated as though he had human sympathy and desires, and was capable of behaving in many respects like a rational being. All large asylums possess an advantage over smaller ones in their greater ability to classify their inmates. The wards and corridors of Colney Hatch and Hanwell are so extensive that they may be likened to different streets inhabited by distinct classes. It is usual to name the compartments according to the mental condition of the patients contained in them. Thus in most asylums we have the refractory ward, the epileptic ward, the paralytic ward, the ward for dirty patients, and the convalescent ward. At Colney Hatch it is considered better to use numbers instead, as the patients soon become acquainted with the denomination of the class to which they belong, and often behave in conformity with it. Thus the lunatic, finding himself in a refractory ward, will sometimes act up to the part assigned to him, when he would otherwise be peaceable. The vice of classification is that it separates the population of an asylum into so many mental castes, which in some measure prevents that easy transition from lunacy to sanity, which it is desirable to maintain. In the choice of difficulties, however,

there can be little doubt that these divisions in lunatic establishments, as at present constructed, present the most convenient as well as the best means of treating the insane, and the errors to which it is liable can at all times be obviated by the careful supervision of the medical officers.

Nothing strikes the visitor with greater admiration than the care taken of the paralytic and imbecile patients, who form so large a per-centage of the inmates of the county asylums. In most cases the sleeping apartments of these poor creatures at Colney Hatch and Hanwell are padded round breast-high, in order that they may not damage themselves against the walls whilst seized with convulsions in bed; and a pillow has been invented perfectly permeable to the air, on which they can lie with their faces downward during the paroxysm of a fit, without the risk of suffocation. In extreme cases even the floor is padded, lest the sufferer should unconsciously throw himself upon it. The bed-ridden paralytic reclines upon a water-bed, and is tended night and morning as sedulously as a helpless babe. The test of the care which prevails in an asylum is to be found in the condition of the persons who cannot help themselves. Where trouble begins, negligence begins also, in an ill-regulated establishment. Nowhere do the alleviations of humanity seem more required than with the idiots and paralytics. Of all the wards at Colney Hatch, these are the most depressing. It is impossible to contemplate a room full of creatures moving about on their seats with a monotonous action like a company of apes, or when paralyzed in their lower limbs, to see them dragging themselves like seals along the floor by the aid of their arms, without being oppressed by the sense of the dreadful condition to which man can be reduced when the mind is ruined and the nerve-power diseased. It is only in these wards and the refractory that on ordinary occasions the stranger would discover that he was among the mentally afflicted. It is reported that a lady, after she had been shown over a large asylum by the celebrated Esquirol, inquired, "But where are the mad people?" All the infinitely finely-shaded stages of lunacy which lie between mental health, wild fury, and chronic dementia are, in the popular idea,

merged in the raving maniac. Yet it is rare for a casual visitor to witness scenes of violence in a lunatic asylum. Those who are mischievous are trained to concentrate their dislike upon the medical officers and attendants rather than upon their fellow-patients. The matron of Hanwell Asylum, in her report for 1856, thus speaks of one of the criminal lunatics who belongs to this refractory class :—

"She seldom interferes with any other patient, the officers and attendants being the special objects of her furious attempts, and her mode of attack is peculiar; there is not usually anything in her manner or appearance to indicate mischief, and she has perhaps previously spoken calmly to the person upon whom—having watched until she has turned her back; for as long as the face is towards her the individual is safe—she springs with the quickness and velocity of a tigress, fastening her hands in the hair, and bringing her victim to the ground in an instant. If not immediately rescued, the head of the unfortunate person is dashed repeatedly upon the floor; and it has been found impossible hitherto to detach the hand of this patient without a quantity of hair being torn by her from the head of the sufferer."

The visiting magistrates are also highly obnoxious to the patients; and their passage through a ward generally leaves behind it a trail of excitement which often generates outbreaks that do not subside for some hours. On the whole, however, it is remarkable how small an amount of violence is attempted by the insane. In Colney Hatch, with its 1,250 patients, there are far fewer personal assaults in a year than would take place in any village containing half the number of inhabitants. Still precautions are always necessary; and the attendants, from long observation, are generally forewarned, and, consequently, forearmed. Special arrangements are made for those persons who have an unusual tendency to injure themselves or their companions. The suicidally inclined are always placed at night in dormitories with other patients, an arrangement which effectually prevents any attempts at self-destruction; while those who have a propensity to commit homicide are provided with separate cells. There is at the present moment a person at Colney Hatch who labours under the delusion that he can only recover his liberty by killing one of the keepers, and in accordance with this idea he has already made several attempts on their lives. A lamentable death took place at Hanwell the year before last, through

the neglect on the part of an attendant to see a homicidal patient properly secured in his apartment for the night.

"On the 12th of April, the patients of No. 7 ward (twenty-five in number) having had their supper, were going to bed at a quarter before eight o'clock —all of them, being more or less refractory, have a single bedroom each. The attendant, in seeing them to bed, inadvertently locked up two (B. and W.) in one room; he stated that, observing the day-clothing of all outside their doors, he supposed that the patients were in their rooms, and, therefore, did not take the precaution to look into them. The room No. 19 was the one usually occupied by W., a man of exceedingly clean habits, of a mild expression of countenance, but very violent, prone to strike suddenly and without provocation any person within reach of him; so frequently had he done this, that he was not allowed to sit near other patients, even at meals, but took his food apart from them at a side-table. B., whose room was No. 10, directly opposite to No. 19, was occasionally violent, always dirty in his habits, and destructive of clothing. It is supposed that this man entered No. 19 room by mistake, and that his presence there excited the homicidal tendency of the other into action. What is known is, that the night-attendant, when he visited the ward at half-past ten o'clock, and went as usual to the room No. 10, found it unoccupied, and the patient's clothes outside the door; then hearing a noise in the room 19, he opened the door, and saw B. extended at full length on his back on the floor, naked and quite dead. W. came out of the room in his shirt immediately the door was opened, and, pointing to B., said, 'That fellow will not allow me to sleep.' There was a mark round B.'s neck as if caused by a cord, which had produced strangulation, and a mark of a severe blow on the top of the nose, and of a bruise on the chest: the bedclothes were in great disorder; amongst them were found the shirt and flannel of B.; one sleeve of the former was twisted like a rope, as if W. had strangled B. with it."

The utmost precaution will not always insure safety, for patients considered quite harmless will now and then commit the most horrible acts. A black man, a butcher, who had been many years in an American asylum, and had never shown any violence, one night secreted a knife, and induced another patient to enter his cell. When his companion had lain down, he cut his throat, divided him into joints, and arranged the pieces round his cell as he had been accustomed to arrange his meat in his shop. He then offered his horrible wares to his fellow-lunatics, carrying such parts as they desired to those who were chained. The keeper, hearing the uproar, examined the cells, and found one man missing; upon inquiring of the black butcher if he had seen him, he calmly replied, "He had sold the last joint!" Even those who have apparently harmless delusions, will sometimes, if thwarted, commit unlooked-for

atrocities. Not many years since, an inquisition was held before Mr. Commissioner Winslow upon a young gentleman who would travel considerable distances to see a windmill, and sit watching it for days. His friends, to put an end to his absurd propensity, removed to a place where there were no mills. The youth, to counteract the design, murdered a child in a wood, mangling his limbs in a terrible manner, in the hope that he should be transferred, as a punishment, to a situation whence a mill could be seen.

Idleness is perhaps a greater curse to the majority of lunatics than to sane individuals. Occupation diverts the mind from its malady. Colney Hatch and Hanwell, from their populousness, and from the fact of their being filled principally by metropolitan lunatics, afford admirable examples of the new method of employing patients in the trades they have been accustomed to follow when in health. As the ranges of workshops at Colney Hatch are the most extensive, we will draw our description from that establishment. Of the male patients, only 245, out of an average of 514 in the house during the year 1855, were employed in labour at all, the remainder consisting of violent maniacs and those afflicted with paralysis, epilepsy, and idiocy, none of whom are capable of undertaking any work. Sixty-five persons were allotted to the gardens, grounds, and farms, leaving 180 to be distributed in the workshops and various offices of the asylum. The tailoring department is the most extensive. Upon the occasion of our visit, there were at least a score of cross-legged lunatics cutting out and making up grey dresses for the inmates, or repairing old clothing, their conduct being in no manner distinguishable from that of sane journeymen. The shoemakers numbered a dozen, every man handling his short knife. Those unaccustomed to lunatics will find it a nervous proceeding to thread their way among so many armed madmen, and will wish themselves well out of this apparently dangerous assembly. Yet, in truth, they are no more to be feared than any similar number of lucid workmen, as the homicidally inclined are carefully excluded. The carpenters planed away merrily among their chips in an adjoining apartment,

using now and then chisel, gouge, and saw in perfect freedom. Many excitable patients have been placed in these shops without any bad result; and even those who are disposed to be mischievous when suspected, have become quiet when trusted with edge-tools of the most formidable description. The greater the confidence reposed in the majority of the insane, the more does it tend to insure good behaviour. Of the other artificers in different departments, we may mention painters, upholsterers, bakers, butchers, brewers, and coopers; whilst a still larger number are employed in the kitchen and dining-hall, or as helpers in the corridors and wards. The services of all these lunatic artisans and labourers were valued last year at 1,059*l.* 3*s.*

As far as possible, the men work at the trades they have previously followed; but there are many patients whose skilled labour cannot be utilized in this comparatively confined community; such, for instance, as rule-makers, jewellers, whalebone-cutters, coach-painters, gold-beaters, buhl-cutters, wax-doll makers, and a score of other heterogeneous craftsmen, who are only to be found in a great metropolis. These persons engage in the employment most suited to them, and thus many of them leave the asylum skilled in two trades. Equally efficacious is the occupation on the farm, which contains seventy-six acres of pasture and arable land, principally dedicated to the rearing and maintenance of stock. On the 1st of January, 1856, there were 28 cows, 1 bull, 2 calves, 152 pigs, 40 sheep, 7 horses, &c. The tending of these animals, the culture of the fields and of the thirty-one acres of ornamental grounds, the milking the cows, the slaughtering of the meat, and the production of the butter, afford varied and healthy employment to the sixty-five agriculturists. Some persons who never handled a spade before, here set to work cheerfully and with a will, and a French polisher, a Wesleyan minister, a school teacher, or a law writer, may be seen digging away at a field of potatoes; or a ship-carpenter, saddler, cabman, coalheaver, and organ-player, diligently engaged in filling a manure-cart. They would, it is true, be better employed in occupations more in accordance

with their previous habits; but these cannot be found for them, and labour of any kind is preferable to idleness. On the female side of the house industry is resorted to as a means of cure to a still larger extent. Of the 503 equal to labour, 270 work as needlewomen, 7 are employed in the kitchen, 72 wash, iron, and clearstarch in the laundry, 125 help in the wards, and 29 attend school, and are otherwise engaged. The total value of the female labour of the house is computed at 500*l.* per annum.

Colney Hatch is not so extensively embarked in industrial and agricultural pursuits as the North and East Riding Asylum, where the patients are received from a mixed manufacturing and agricultural population, and the produce of their fields and workshops is much greater than could be extracted from worn-out metropolitan patients. Not only do the lunatics rear the vegetables, but they take them to the asylum gates and dispose of them to the public. The result affords a proof of what we hold to be a settled principle, that chronic cases of insanity are greatly benefited by as much intercourse as possible with the saner part of the community.

In accordance with the opinion that pursuits of lunatics should be similar to their pursuits in former days, the south wing of Haslar Hospital is devoted to the officers, seamen, and marines of her Majesty's fleet who are afflicted with insanity. Every window of the building commands a fine view of Spithead and the Isle of Wight, and here the old Salts can sit and watch the splendid panorama crowded with vessels, and active with that nautical life which recalls so many happy associations to their minds. They form fishing parties, make nets, and go on pleasure excursions in row and sailing craft. The "madman's boat" of eight oars, manned by patients and steered by an attendant, is well known to the sailors on the Solent, and so harmless are they considered, that young ladies often accompany them on trips to the Isle of Wight, implicitly trusting in their seamanship and politeness.

Mental labour, as a means of cure, has not been adopted in England to any great extent; most asylums have their libraries,

in which attentive readers are always to be found, but the inmates rarely attempt to produce amusement or instruction for their fellows. There is one signal exception to this rule in Murray's Royal Asylum at Perth.* This establishment, under the superintendence of Dr. Lauder Lindsay, appears to be the very focus of intellectual activity. The programme for the winter session of 1856-7 reads more like the prospectus of the Athenæum of some large city than the bill of fare for a lunatic asylum. Famous professors reflect in its lecture-room the philosophy and science of the outer world, and their choice of subjects would not be disavowed by the committee of a London Scientific Institution.

Lecturer.	*Subject.*
1. Professor Blackie, University of Edinburgh.	Beauty.
2. Hugh Barclay, Esq., LL.D., Sheriff-Substitute of Perthshire.	Authenticity of Ossian's Poems.
3. Thomas Miller, Esq., LL.D., Rector of Perth Academy.	Chemical Affinity.
4. George Lawson, Esq., Demonstrator of Botanical Histology, University of Edinburgh.	Vital Phenomena of Vegetation.
5. Rev. Dr. Crombie, of Scone, late Moderator of General Assembly.	Winter: its lessons and associations.
6. Rev. John Anderson, Kinnoull.	Sketches from the History of Ancient Nations.
7. Rev. Wm. Murdoch, Kinnoull.	Education: its aims and uses.
8. Dr. Browne, Crichton Royal Institution, Dumfries.	The Genesis of Thought.
9. Dr. Fairless, Crieff.	Electricity: its phenomena and applications.
10. Dr. Stirling, Perth.	Natural History of Man.
11. Alex. Corall, Esq., Montrose.	Natural History of Zoophytes.
12. Thomas R. Marshall, Esq., Edinburgh.	Art: in its applications to common life.

These scientific and philosophic expositions are attended by all the better class patients. The paupers have a separate set of lectures and classes, the major part of which are delivered and conducted by the inmates themselves. Galvanism, the Blood, Time, Economic Botany, are among the subjects which the deranged brains of the Perth asylum are contented to

hear elucidated. The activity of the place does not stop here: chamber concerts, in which the patients perform; grand concerts, in which artists from without supply the leading stars; and theatrical performances, in which the different characters are all taken by "resident actors," are among the resources which were employed to amuse and interest the inmates during the winter months just past. A pit full of lunatics watching "Box and Cox" played by their fellows, is a curious subject for contemplation. Not content with these efforts, they seem to think that they are nothing unless critical, and accordingly they have set up a journal, in which they review their own performances. The first number of *Excelsior* is now before us, in which we find poetry, news, and criticisms on music, and contemporary literature; and he who reads with the idea of finding anything odd in this production, will most certainly be mistaken; for no one could divine that there was a "bee in the bonnet" of printer, publisher, and contributor. Balls and conversaziones form the staple of the lighter recreations of this singular community, whilst the more athletic games of running, leaping, hurdle-racing, Highland dancing, putting the stone, footing the bar, and lifting dead weights, are pursued with such success, that the lunatics boast with pride that they have beaten some of the prize-holders of the outer world.

It might be supposed that intellectual striving was not the medicine to offer to a diseased brain; but we are informed by Dr. Lindsay that in the vast majority of cases the best results flow from this method of treatment, and that a large percentage of cures is obtained. Such patients as would be injured by stimulating their faculties are debarred by the physician from their undue exercise, and others must be too far gone, or be too uninformed, to be capable of the pursuit. The surprise that lunatics should be susceptible of healthy mental exertion, arises from the common forgetfulness that many understandings are slightly affected, or are only deranged upon particular points. When Nat Lee was in Bedlam, he said that it was very difficult to write like a madman, and very easy to

write like a fool. The works of the fools are more voluminous than the works of the madmen, because there are more fools than lunatics; but those who are completely mad are so far from experiencing a difficulty in writing in their own character, that they cannot write in any other. As many, however, who are not altogether right in their minds, are no more exclusively insane than people who are not absolutely wise are entirely foolish, it is easy to see that they may still be equal to much profitable mental exertion. In these days poor Christopher Smart would not be deprived of his pen and ink, and compelled to indent his long poem on "David" with a key on the panels of his cell; nor perhaps would the following epigram, which a woman in Bedlam wrote on Martin Madan's argument in favour of polygamy, be handed about as a phenomenon to be wondered at:—

"If John marry Mary, and Mary alone,
It is a good match between Mary and John:
But if John marry more wives, what blows and what scratches!
'Tis no longer a match, but a bundle of matches."

In France, and we believe in some other continental countries, it is the habit to employ lunatic labour in the private farms surrounding the asylum. This plan was in the olden time pursued in England; but it appears to have gone out with the ancient system of coercion. When radical revolutions are accomplished, good ideas sometimes perish with the bad; and we cannot help thinking that the abandonment of this method of exercising lunatics was an error, and that a return to the old practice, under proper regulations, would be of advantage both to employer and employed. Never must we lose sight of the wisdom of freeing the patient as much as practicable from the companionship of his fellows, and of placing him, to the utmost of our power, in the same free condition which he enjoyed in his days of sanity.

At Colney Hatch, as at Hanwell, and indeed all other public asylums, the sexes occupy separate portions of the building, and are only allowed to be present together on particular occasions. This unnatural arrangement undoubtedly arose from the in-

troduction into asylums of prison and workhouse systems of management; for certainly nothing can tend to render the life of the patient more dreary than to find himself carefully excluded from the company of the other half of creation. It is stated by the advocates of separation that the mingling of the sexes among the insane would be productive of occasional misbehaviour; but nothing could be more unjust than to deprive the majority of the benefits which would arise from frequent social reunion, in consequence of the erotic tendencies of the few. It is with pleasure, therefore, we see the attempts which are being made to assimilate the intercourse of lunatics to that of the sane at Hanwell, Colney Hatch, and other asylums. The most interesting feature of the former establishment is the ball which takes place every Monday night. Shortly after six o'clock the handsome assembly-room, brilliantly lit with gas, becomes the central point of attraction to all the inmates, male and female, who are considered well enough to indulge their inclinations for festivity. On the occasion of our visit there were about 200 patients present, together with a few visitors and many of the attendants. In a raised orchestra five musicians, three of whom were lunatics, soon struck up a merry polka, and immediately the room was alive with dancers. In the progress of this amusement we could see nothing grotesque or odd. Had the men been differently dressed, it would have been impossible to have guessed that we were in the midst of a company of lunatics, the mere sweepings of the parish workhouses; but the prison uniform of sad-coloured grey presented a disadvantageous contrast to the gayer and more varied costumes at Bethlehem, and appeared like a jarring note amid the general harmony of the scene. In the corners of the room whist-players, consisting generally of the older inmates, were seen intent upon their game; not a word was uttered aloud, not a gesture took place that would have discredited any similar sane assembly; yet not a patient was free from some strange hallucination, or some morbid impulse. Among the merriest dancers in Sir Roger de Coverley was a man who believed himself to be our Saviour, and who wore in his hair a

spike in imitation of the crown of thorns; and one of the keenest whist-players was an old lady, who, whilst her partner was dealing, privately assured us she had been dead these three years, and desired as a favour that we would use our influence with the surgeon to persuade him to cut off her head. In the midst of such strange delusions, it was curious to notice how rationally those who were their dupes enjoy themselves; and it is impossible to deny that such reunions are eminently calculated to hinder the mind from morbidly dwelling upon its own unhealthy creations. It is found that the too prolonged and frequent repetition of the balls somewhat diminishes their interest—an evil provided against at Hanwell by restricting the time allotted to them. At nine precisely, although in the midst of a dance, a shrill note is blown, and the entire assembly, like so many Cinderellas, breaks up at once, and the company hurry off to their dormitories. These hebdomadal balls have not yet been introduced at Colney Hatch. A movement has, however, been made latterly towards a limited association between the sexes by allowing them to dine together. Of the 500 patients who assemble in the ample dining-hall, 200 are females and 300 males. The scene when the women first made their appearance is described as something remarkable; the men rose in a body apparently delighted beyond measure, and the presence of the softer sex has not only tended to break the former monotony, but to keep the assembly in order and good humour. Before this happy meeting there were occasional outbreaks of some of the more excited patients; but now, when any of the men are inclined to be fractious or discontented, the women turn them into joke, and they are silenced immediately. As yet the two sexes are not allowed to sit at the same table, but are located on opposite sides of the room. By far the better plan would be to seat them on different sides of the long tables; but as many persons in authority, wanting confidence in human nature, object to this natural arrangement, the innovators must be satisfied for the moment with the present imperfect concession. When it was first proposed to introduce a billiard-table at Bethlehem, the scheme

was rejected by a majority of two-thirds of the governors, on the score that the players would fight each other with the cues and balls, and bagatelle, as a kind of half measure, was permitted instead. As the patients confined the balls to their legitimate purpose, and the mace was not turned into an offensive weapon, the billiard-table was at last with reluctance established. The same thing will doubtless happen with respect to the dining arrangements at Colney Hatch; and before long we trust male and female lunatics will exchange courtesies across the table instead of across the room.

In the chapels of nearly all the larger lunatic asylums the quieter inmates are accustomed to meet at the daily morning and evening service. In the spacious chapels of Hanwell and Colney Hatch, the attendance on week days, as well as on the Sabbath, is far better than can be found among the same number of people out of doors, 250 on the average attending on week days, and 500 on Sundays. We do not suppose that the lunatic is more religious than the sane, but the *ennui* which, to a certain extent, still attaches to the asylum renders any form of reunion agreeable; and as the going to chapel is "something to do," numbers of the inmates obey the summons who might stay at home if they were at large. The conduct, nevertheless, of this congregation is most exemplary. "The heartiness," says the chaplain, in his report for 1856, "with which they join in the responses and the psalmody is very encouraging, while their quiet, orderly conduct—the prayer offered up by many on entering chapel, the regularity with which they all kneel or sit, according to the order of the service—would, I think, if generally witnessed, put to the blush many of our parochial congregations." Now and then an epileptic patient will disturb the chapel by his heavy fall; but as those who are thus afflicted are located near the doors, the interruption is but momentary. The chaplain of Colney Hatch has trained twelve male and female patients to practise church music and psalmody. The choral service is well performed, and, in conjunction with the organ, has a visible effect in soothing the wilder patients, and in pleasing all. The sacrament is not denied to those who

are fit to receive it, and no more touching scene can be witnessed than that which is presented in the chapel, when a score of communicants, disordered though their minds sometimes be, humbly kneel, and

"Drain the chalice of the grapes of God."

The out-of-door games of the insane are very much regulated by the extent of ground attached to the asylum. Where this is ample, as at Colney Hatch, cricket is the favourite summer recreation; a skittle-alley, a bowling-green, and a fives-court, are found in most county asylums. In America, where women adopt more masculine habits than in England, female lunatics play matches on the bowling-green; and in France gymnastic exercises are employed for the exercise of both sexes, and may, we think, be introduced into the English asylums with advantage. The idiotic patients and those who are incapable of much exertion may be seen in the airing courts enjoying the monotonous swinging motion of the machine known in domestic life under the name of "the nursery yacht," being nothing more than a rocking-horse with the horse left out by particular desire. In addition to these means of diverting the minds of the patients, walking parties, under the superintendence of officers of the establishment, are made up two or three times a week. During the haymaking season it is customary to allow the inmates of asylums to which farms are attached to go forth into the fields to assist with the rake and the pitchfork. This permission is always looked upon as a great treat, and its effect upon the patients is of the happiest kind, especially *if the scene of their temporary labour admits no sight of the asylum and its wearisome walls.* Here for a few hours they seem to realize the liberty and delight of younger days. The physician on such occasions may read in their "grateful eyes" that we are at present arrived only half way on the road of non-restraint. Individual patients, again, are suffered to leave the public asylums on a day's visit to their friends, under the care of a nurse; and some who are nearly convalescent are permitted to go and return of their own accord. It is the custom of Colney

Hatch and Hanwell, and we believe of most asylums in England, to grant the patients a certain period of probation among their friends, in order to test their fitness to be discharged as cured; to give them, in short, mental tickets-of-leave. This is an admirable plan, inasmuch as it secures to the patient the full enjoyment of liberty, at the same time that it enables him to keep himself well in hand, knowing that, as he is not unconditionally released, an immediate recall to the asylum would follow any sign of returning irrationality.

The dietary in public asylums is ample, and the quality excellent. Hanwell may, perhaps, be considered the model establishment in this respect. It is the joke of the other asylums, that one man has been regaled there daily for years with chicken and wine. Even the fancies of the patients are now and then gratified at some expense. There is an old lady in Hanwell who believes that the whole establishment is her private property; and, on one occasion, she complained to the medical superintendent that, notwithstanding all the expense she was at to keep up the grounds and forcing-houses, she never could get any grapes. The next day she was presented with a bunch, which had been purchased to appease her repinings. This humouring method of treatment, as it is called in other asylums, is much patronized by the matron, a person who seems to enjoy as much power as the medical officers. In her report for 1856 she thus speaks of a patient who died in the course of last year:—

"She had been employed many years in the laundry, and always imagined she was to be removed elsewhere—that on Monday morning a waggon would call at the gate for herself and her property. Accordingly, every Monday morning throughout the year, at 10 o'clock, she was accompanied to the gate, dressed with a coloured handkerchief pinned fancifully over her cap instead of a bonnet, and carrying a small parcel (*her property*) of the most heterogeneous contents—thimbles, ends of tape, polished bones, pebbles, pieces of smooth coal, &c. The waggon was never found to be in waiting, and Mary, without evincing any disappointment, walked cheerfully back to the laundry, telling the superintendent that 'The waggon would be sure to come next Monday, but that she need not lose time, so she would work all this week.'"

In many asylums this method of treatment is thought calculated to feed the original delusion; but here, again, the judg-

ment of the physician ought alone to determine the course to be taken in each individual case. In patients labouring under violent excitement, to oppose an hallucination, however absurd, would add fuel to the fire. Again, in a chronic case like that of the laundry-maid, the harmless fancy of the poor creature might not only be indulged in with impunity, but served to renew week by week her stock of cheerfulness.

The lunatic colony of Gheel, situated twelve miles south of Turnhont, in Belgium, amid a vast uncultivated plateau consisting of heath and sand, called the Campine, affords an extraordinary example of the pre-eminent advantages of the present mode of managing lunatics. Until the era of railroads this spot was so out of the ordinary track of the world, that but few persons even of those who were interested in the treatment of the insane were aware of its existence. Here we discover, like a fly in amber, a state of things which has lasted with little change for twelve hundred years. Here we see the last remnants of the priestly treatment of insanity, coupled with a system of non-restraint which certainly existed long before the term was ever heard of in England and France. Gheel owes its origin to a miracle. Saint Dympna, the daughter of an Irish king, suffered martyrdom in this place from the hand of her father in the sixth century. So great was her fame as the patron saint of lunatics, that her shrine, erected in the church dedicated to her, speedily became the resort of pilgrims, who journeyed hither in the hope of being cured of their madness or of preventing its advent. Her elegantly-sculptured tomb contains among other bassi-relievi one in which the devil is observed issuing from the head of a female lunatic, while prayers are being offered up by some priests and nuns, and close at hand another chained maniac seems anxiously awaiting his turn to be delivered from the demon. The idea carefully inculcated by the priests, that lunacy meant nothing more than a possession by the devil, has long been banished from other lands. Here, however, it has flourished for many centuries, and the ceremony of crawling beneath the tomb has existed so long, that the hands and knees of the devotees have worn away the pavement.

The act is still occasionally performed amid a scene in which superstition and terror are combined in a manner calculated to cure any lunatic, if deep mental impressions were alone required to purge away his malady. But what is far more interesting and astonishing to those accustomed to the bolts and bars, the locks, wards, and high walls of crowded European asylums, is the almost entire liberty accorded to the lunatics resident in the town of Gheel and its neighbouring hamlets, to the number of 800, or one-tenth of the whole district. No palatial building, such as we encounter in nearly every county in England, is to be seen. The little army of pauper and other patients gathered from the whole superficies of Belgium, instead of being stowed away in one gigantic establishment, in which all ideas of life are merged in the iron routine of an enormous workhouse, are distributed over five hundred different dwellings, three hundred of which are cottages, or small farmhouses, in which the more violent and poorer classes are dispersed, and the remaining two hundred are situated in the town of Gheel, and are appropriated to quieter lunatics and those who are able to pay more liberally for their treatment. In these habitations the sufferers are placed under the care of the host and hostess; more than three persons never being domiciled under one roof, and generally not more than one. The lunatic shares in the usual life of the family; his occupations and employment are theirs, his little cares and enjoyments are the same as theirs. He goes forth to the fields to labour as in ordinary life; no stern walls perpetually imprison him, and make him desire to overleap them, as Rasselas desired to escape even from the Happy Valley. If it is not thought fit for him to labour with plough or spade, he remains at home, and takes care of the children, prunes the trees in the garden, and attends to the potage on the fire; or if a female, busies herself in the ordinary domestic duties of the house. The lunatics, as may be supposed, are not left to the discretionary mercies of the host and hostess. A strict system of supervision prevails, somewhat analogous to that of the lunacy commissioners and the visiting justices of England. The entire country is divided into four districts, each having a head

guardian and a physician, to whom is entrusted the medical care of every inmate belonging to that section. There are, in addition, one consulting surgeon and one inspecting physician for the whole community. The general government of the colony is vested in the hands of eight persons, who dispense a code of laws especially devised for it. The burgomaster of Gheel presides over this managing committee, whose duties are to distribute the patients among the different dwellings, to watch over their treatment, and to admit or discharge them. A visiting commissioner is annually appointed, who inspects the dwellings of the different hosts, and sees that the patients are properly cared for. The oversight of the lunatics falls almost wholly upon the hostess, the man rarely interfering, unless called upon to control a disorderly patient. The people of Gheel, from having been engaged for ages in the treatment of the insane, are said to have acquired extraordinary tact in their management, which, Dr. Webster remarks, may be considered to exhibit a most judicious mixture of "mildness and force." Although instruments of restraint, such as the strait-waistcoat, and the long leathern thong below the leg, to prevent patients from running away, are occasionally resorted to, the sectional physician must be instantly informed of their imposition, and their use cannot be continued without his sanction. So little are they required, that Dr. Webster found less restraint in this colony, unconfined by walls, than in the asylum at Mareville, in France, containing a similar number of lunatics. Yet there were fewer escapes than from the strictly-guarded restraint-abounding prison, only eleven persons having fled from Gheel in the course of last year, and nineteen from Mareville.* Here also, it will be observed, there is no separation of the sexes. The lunatics live the life of the other inhabitants, and males and females associate in the same household. If we compare the effects of this simple treatment with that of the most expensive of our own asylums, we are compelled to admit that the balance is in favour of Gheel, where, notwithstanding the free admission of chronic cases, upwards of twenty-two per cent. of cures takes place annually, while at Hanwell and Colney

Hatch the cures never exceed fifteen per cent. No fair comparison can be instituted between the expense per head at Gheel and in our English establishments, inasmuch as living is much cheaper in Belgium; but we may state, that the average cost of board and lodging for each pauper in the colony is 10*l.* per annum, or exactly the sum charged for lodging alone in our county asylums.*

A plan, towards which we have been slowly advancing during the last half-century, will speedily, we hope, be more closely followed. A trial is already, to some extent, being made of it in the neighbourhood of existing asylums, and might supplant, with immense advantage, the prevailing custom of building new wings, and over-populating old wards. The present system of enormous buildings, which destroys the individuality of the inmates, and suppresses all their old habits and modes of life, is evidently disapproved by the commissioners, as appears from the language they hold in their tenth annual report:—

"We have the best reason for believing that the patients derive a direct benefit, in many ways, from residing in cheerful, airy apartments detached from the main building, and associated with officials engaged in conducting industrial pursuits. A consciousness that he is useful, and thought worthy of confidence, is necessarily induced in the mind of every patient, by removal from the ordinary wards where certain restrictions are enforced, into a department where he enjoys a comparative degree of freedom; and this necessarily promotes self-respect and self-control, and proves highly salutary in forwarding the patient's restoration. As a means of treatment, we consider this species of separate residence of the utmost importance, constituting in fact a probationary system for

* These particulars respecting the pauper lunatic colony of Gheel are taken from an article by Dr. Webster in Dr. Winslow's *Journal of Psychological Medicine*. This review, which originated with and from the first has been under the able editorship of Dr. Forbes Winslow, has given an immense impulse to the study of psychology. It has enlarged the views of the physician of the insane, and, by extending his horizon, has given him a far better knowledge of the special department to which he formerly confined his studies. It is as impossible to understand the workings of a morbid mind without possessing a knowledge of its ordinary action as it is to interpret the sounds of a diseased lung without being first acquainted with those of a healthy one. The great service which Dr. Forbes Winslow has rendered by unravelling the phenomena of mind in its normal as well as in its disordered state, entitles him to a very high meed of praise, and has deservedly ranked him among the first medico-psychologists of the present day.

patients who are convalescing; giving them greater liberty of action, extended exercise, with facilities for occupation; and thus generating self-confidence, and becoming not only excellent tests of the sanity of the patient, but operating powerfully to promote a satisfactory cure. The want of such an intermediate place of residence is always much felt; and it often happens that a patient just recovered from an attack of insanity, and sent into the world direct from a large asylum, is found so unprepared to meet the trials he has to undergo, by any previous use of his mental faculties, that he soon relapses, and is under the necessity of being again returned within its walls. Commodious rooms contiguous to the farm-buildings are now in the course of construction at the Somerset County Asylum; and there is every reason to believe that the patients will derive benefit by residing in these apartments, which at once possess a domestic character, and afford every facility to carry on agricultural pursuits."

It strikes us forcibly that the commissioners have tended to create the evil they deprecate in not protesting against the erection of gigantic asylums; but it is cheering to find that the idea of supplemental buildings possessing a "domestic character" has taken possession of their minds, and that they are now enforcing it on the minds of others with their well-known zeal and ability. The Devon Asylum, among others, has adopted the plan; and its accomplished physician, Dr. Bucknill, the editor of the *Asylum Journal*, bears important testimony to the great advantages to be derived from it.

"I have recommended the erection of an inexpensive building, detached from, but within the grounds of the present asylum, in preference to an extension of the asylum itself. My reasons for this recommendation are, that such a building will afford a useful and important change for patients for whom a change from the wards is desirable. The system of placing patients in detached buildings, resembling in their construction and arrangements an ordinary English house, has been found to afford beneficial results in the so-called cottages which this institution at present possesses. *These cottages are much preferred to the wards by the patients themselves, and permission to reside in them is much coveted.* I am also convinced that such auxiliary buildings can be erected at much less expense than would be incurred by the enlargement and alteration of the asylum itself. I propose that in the new building the patients shall cook and wash for themselves."

"These cottages are much preferred to the wards by the patients themselves, and permission to reside in them is much coveted." In these few lines we read the condemnation of huge structures like Colney Hatch, built externally on the model of a palace, and internally on that of a workhouse, in which the poor lunatic but rarely finds any object of human interest, where

his free-will is reduced to the level of that of a convict, and the very air of heaven necessary to his health is doled out at intervals, when, with infinite lockings and unlockings, the attendants order a batch of persons into the stagnant and tiresome airing courts. Infinitely better for the lunatics would be the freedom and homeliness of the smallest cottage to the formal monotony of cheerless wards; better far that they should, as Dr. Bucknill suggests, cook and wash for themselves, than that the offices should be performed wholesale in the steam-laundry and the steam-kitchen. A patient would undoubtedly feel a far greater interest in peeling his own potatoes for the pot, and in cooking his own bit of bacon, than in receiving them ready cooked. It is the duty of the physician to interest the patient in his daily work, and no more effectual method of accomplishing this could be suggested than in putting him to work for himself.

Wherever large asylums are already erected, no better plan could perhaps be suggested than the building of satellite cottages, which would form a kind of supplementary Gheel to the central establishment; but we should like to see the experiment tried, in some new district, of reproducing in its integrity the Belgian system. The colony of Gheel was once a desert like the country which surrounds it; it is now, through the happy application of pauper lunatic labour, one of the most productive districts of the Low Countries. Have we no unoccupied Dartmoors on which we could erect cottages, and train the cottagers to receive the insane as members of the family? The performance of domestic offices, the society of the goodwife and goodman, and the influence of the children, would do far more to restore the disordered brain of the lunatic—pauper or otherwise—than all the organization of the asylum, with its daily routine, proceeding with the inexorable monotonous motion of a machine, and treating its inmates rather as senseless atoms than as sentient beings, capable, though mad, of taking an interest in things around them, and especially awake to the pleasure of being dealt with as individuals rather than as undistinguishable parts of a crowd. The children are of

particular moment. Lunatics are singularly gentle to them, and are interested in all their actions. At Gheel it is customary to send the bairns into the fields to conduct the patients home from their labour in the evening; and we learn from Dr. Webster that a violent madman, who would not stir upon the command of his host, will suffer himself to be led, without a murmur, by an urchin scarcely higher than his knee. The presence of the young in the ward of an asylum seems to light it up like a sunbeam. The love of children does indeed lie at the very foundation of the human heart, and we cannot estimate too highly their beneficial influence upon the brain which is recovering from the horrors of insanity.

One of the most important points in reference to insane paupers, as we have already intimated, is the bringing them as speedily as possible under treatment. The reluctance of the lunatic himself to be removed is usually extreme, and it is marvellous what ingenuity he will often employ to thwart the design. Southey relates that a madman who was being conveyed from Rye to Bedlam slept in the Borough. He suspected whither he was going, and, having contrived by rising early to elude his attendant, he went to Bedlam, and told the keepers that he was about to bring them a patient. "But," said he, "in order to lead him willingly, he has been persuaded that I am mad, and accordingly I shall come as the madman. He will be very outrageous when you seize him, but you must clap on a strait-waistcoat." The device completely succeeded. The lunatic returned home, the sane man was shut up, and until he was exchanged at the end of four days, remained in his strait-waistcoat, having doubtless exhibited a violence which amply justified its use. The aversion of the sufferer himself to be taken away coincides with an equal aversion on the part of his relatives and friends to send him from home, nor do they take the step till the madness grows intolerable. Precious time is thus lost at the outset, and when the removal occurs it is mostly to the workhouse. Here the patient is usually kept during the remainder of the curable stage of his malady. The parochial authorities are generally guided by an immediate consideration

for the pockets of the rate-payers, rather than by any care for the welfare of the lunatic; and, as they can maintain him in the "house" at three shillings a-week—when they would have to pay nine if they transferred him to the county asylum—in the workhouse he remains until he becomes so dirty or troublesome in his habits that the guardians are willing to pay the difference to get rid of him. The first few months of the disease, within the narrow limits of which full 60 per cent. of the recoveries take place, are thus allowed to run to waste. Months fly by, and the victim subsides into the class of incurables. This produces a second evil. As the drafts of incurables are perpetually flowing into the asylums, they become "blocked up" in the course of a few years, and are converted into houses for the detention of hopeless cases. To this condition three-fourths of the asylums are already reduced, and the efforts of philanthropic medicine are brought to a dead lock by the short-sightedness of the parish authorities, who do not consider that for the sake of saving a few shillings in the board of Betty Smith in the first weeks of her craziness, they are converting her into a chronic burthen, seeing that she will probably live on to a good old age in the asylum, and cause them an ultimate expenditure of hundreds of pounds. To the swifter removal after the outbreak of the disorder we must look for a permanent remedy; but in the mean time something must be done to disembarrass the public asylums of the dead-weight of hopeless cases, if we seriously intend to take advantage of the curative appliances we already possess. The commissioners seem inclined to favour the erection of separate asylums for those who are beyond the reach of medical art. To us it seems that the more economical plan would be to apportion certain wards in the various workhouses for the reception of chronic cases, and to draft off the idiots alone to special establishments. By this means our water-logged asylums would speedily right themselves, and again become what they should never have ceased to be—hospitals for the *cure* of the insane. At present we encourage an elaborate system for the manufacture of life-long lunatics. It is well known that the cures of early cases of insanity

throughout England amount to 45 per cent., and at Bethlehem and St. Luke's, where no others are received, the cures have amounted to 62 per cent. and 72 per cent. respectively; whereas at Colney Hatch, Hanwell, and the Surrey County Asylum, the three great receptacles for the sweepings of the metropolitan workhouses, the average cures do not exceed 15 per cent. If we take the lowest averages of cures, there is still a difference of 30 per cent. of human creatures who sink down into the cheerless night of chronic dementia and idiotcy, or who dream away the remainder of their lives in hopeless childishness. Another ground of complaint is, that a degree of clerk's work is imposed upon the medical superintendents of large asylums which is quite inconsistent with a proper discharge of their chief duty—the recovery of their patients. Irrespective of the routine-labour of making daily and quarterly and yearly reports, which is very considerable, they have far more to do in their strictly professional capacity than they can possibly accomplish. The three great asylums near the metropolis contain upwards of 3,000 patients, or the population of a good-sized country town; and their moral and physical training is confided to exactly six medical men, or as many as will be found in an hospital of a hundred beds! It is needless to observe how little attention can be paid to each individual, and that the more promising patients must be inevitably swamped in the sea of hopeless lunatics. As long as our asylums remain mere houses of detention, the want of medical superintendence is not so apparent; but immediately these establishments are restored to their proper functions, we predict that the evil will become too glaring to last.

In many boroughs the authorities have entirely evaded the requirements of the Act of Parliament relative to their insane pauper poor, and have not only neglected to erect proper asylums, but have resisted for years the attempts of the commissioners to compel them to do their duty. In all such cases the lunatics not only suffer the ills consequent upon insufficient care, but when too numerous for home accommodation are subjected to a system of *transportation*, which is not

only disgraceful to the municipal authorities themselves, but to the age for permitting it. True to their economical instincts, the guardians of the poor often "farm out" their insane paupers to the proprietor of some private asylum, quite regardless of distance. The commissioners, justly indignant at this sordid practice, state in one of their Reports that—

"At present, large numbers of these patients are sent to licensed houses far from their homes, to distances (sometimes exceeding, and often scarcely less than, 100 miles) which their relations and friends are unable to travel. The savings of the labouring poor are quite insufficient, in most cases, to defray the expense of such journeys, and their time (constituting their means of existence) cannot be spared for that purpose. The consequence has been, that the poor borough lunatic has been left too often to pass a considerable portion of his life, *and in some cases to die, far from his home, and without any of his nearest connexions having been able to comfort him by their occasional presence.* The visits of his parish officers are necessarily cursory and unfrequent, and he is, in fact, cast upon the humanity of strangers, whose prosperity depends upon the profits which they derive from maintaining him and others of his class."

This is a system which we are confident is as illegal as it is heartless, and we are astonished that bodies of Englishmen should dare to insult the miseries of lunatics by thus punishing them and their friends for their affliction. There were not long since twenty-five insane paupers at Camberwell House, London, who had been sent from Southampton, a distance of eighty miles, though the Hants County Asylum is situated within sixteen miles of the borough. Seventeen persons were in like manner banished from Great Yarmouth to Highbridge House, near London, and their relations, who had to travel 146 miles to see them, passed, in the course of their journey, the Norfolk and Essex County Asylums, both of which establishments had many vacancies and would willingly have received them. The pauper lunatics of Ipswich, King's Lynn, Dover, Canterbury, Portsmouth, and various other boroughs, are in the same way transferred by the local authorities to some of the metropolitan licensed houses.

The feelings of the poor for their afflicted relatives are often of the deepest kind, and the utmost distress is entailed upon them by these cruel separations from those they love. In one

case, a native of Ipswich, too poor to go by the railway, walked to London and back on foot, a distance of 140 miles, for the sole purpose of visiting his wife, who had been wickedly banished to Peckham House, London. In other cases parents have pleaded so piteously to be conveyed to their children, that the commissioners have suggested that the expenses should be paid out of the parish funds, but the authorities who had contrived the original proceeding in order to save two or three shillings a head, could not of course be induced to furnish money for so sentimental a purpose. The commissioners have resolutely refused their sanction to such disgraceful transactions whenever they have come within their knowledge and jurisdiction—one instance out of many which prove that, however much the borough authorities may denounce them as a centralized power, they have done excellent service in checking local ignorance, selfishness, and inhumanity.

If we now turn to consider the condition of private asylums, we shall find much in them to praise as well as to condemn. When men of reputation, acknowledged skill, and character—such as Drs. Conolly, Forbes Winslow, Sutherland, and Munro, of London; Drs. Hitch, Noble, Newington, Fox, in the provinces, have the management of private asylums, the public need be under no apprehension of patients being improperly received, illegally detained, or cruelly and unscientifically treated. The licensed houses in the metropolitan district directly under the control of the Lunacy commissioners, amounting to forty-one in number, represent, without doubt, the fairest specimens of these establishments. Liable as they are at any moment to the inspection of the commissioners, and presided over as many of them are by the most eminent members of the profession, they are generally maintained in a high state of efficiency. They are principally devoted to the care of the higher classes of the community, and afford perhaps the nearest approach yet made to a perfect method of treatment, being conducted in most cases on the principle of a private family. The bolts, bars, high walls, and dismal airing-

courts of the public asylum are either unknown, or so hidden as no longer to irritate the susceptible mind of the lunatic. The unwise division of the sexes is not as a rule adopted. Scrupulous attention to dress and all the forms of polite society are enjoined alike for their own sake, and as a method of interesting patients in the daily life of the community. When we partook of the hospitalities of one of these establishments, we could detect nothing in the countenances or the appearance of the guests which was characteristic of their condition: the restless eye, the incoherent conversation, the sudden movement of the peculiarly formed head, which our preconceived notions led us to expect, were none of them observable. One individual indeed there was whom we mentally concluded to be certainly mad. Yet, singular to say, this gentleman was the only sane individual in the room, besides ourselves and the medical superintendent; and on further acquaintance, having told our ill-placed suspicions, he frankly confessed that he had in his own mind paid ourselves a similar compliment. The eager glance of curiosity natural to inquisitive strangers was the nearest approach in this lunatic party to the outward appearance of lunacy. So much for the "unmistakeable" countenance of the insane! It is not to be supposed that the more violent can be allowed this social freedom even in private establishments, or that madness is different in a metropolitan licensed house from what it is in a public asylum; but we unhesitatingly assert that in the vast majority of cases the large amount of freedom and the absence of any prison-like characteristics have an undoubted effect, not only in calming the mind of the patient, but in expediting his recovery. Hence the per-centage of cures in a high-class private asylum are immeasurably beyond those of any public establishment. The pleasure-ground, out-of-door games, carriage and riding parties, billiards, whist and evening parties, all contribute their aid in restoring the unhinged mind. We have seen four or five patients leave the doors of one of these licensed metropolitan houses (the establishment of Dr. Forbes Winslow, "Sussex House," Hammersmith), and remain out for hours without any attendant,

their word of *honour* being the only tie existing between them and the asylum.*

The condition of a few of the provincial licensed houses is

* In the subjoined passage, which is extracted from an official communication to the Commissioners in Lunacy, and published in one of their parliamentary reports, Dr. Forbes Winslow explains the principles which should guide the physician in the moral treatment of the insane when placed under legal control and supervision :—"In the management of the insane, and in the conduct of asylums, both public and private, the principle of treatment should consist in a full and liberal recognition of the importance of extending to the insane the *maximum* amount of liberty and indulgence compatible with their safety, security, and recovery; at the same time, subjecting them to the *minimum* degree of mechanical and moral restraint, isolation, seclusion, and surveillance, consistent with their actual morbid state of mind at the time. It is also necessary to bear in mind as an essential principle of curative treatment, the importance of bringing the insane confined in asylums, as much as possible, within the sphere of social, kindly, and domestic influences. In many cases, isolation, seclusion, and an absolute immunity from all kinds of stimuli, physical and mental, are, during the acute and recent stages of insanity, indispensably necessary to recovery; but in certain forms of melancholia, monomania, and in some chronic morbid states of mind, no mode of moral treatment is productive of such great curative results as that now referred to. I need not observe that this system of treatment cannot be adopted except in those establishments where there is an active, experienced, and intelligent resident medical officer, who fully appreciates the great value of such homely family influences upon the minds of the insane. In our moral treatment, do we not occasionally exhibit an excess of caution, and exercise, with the best and kindest intentions, an undue amount of moral restraint and vigilance? I think we may sometimes err in being a little too distrustful of the insane. Whilst urging the necessity, in certain forms of morbid mind, of great and constant watchfulness, particularly in cases of suicidal monomania, and recent and acute attacks, I would suggest, to those having the management of asylums, the necessity, with the view to the adoption of a curative process of treatment, of placing more confidence in those entrusted to their care, and of allowing the patients a greater amount of freedom, indulgence, and liberty than they at present enjoy in many of our public and private asylums. In many phases of insanity in which confinement is indispensable, the patient's word may fully be relied upon; and under certain well-defined restrictions, he should be permitted to feel that confidence is reposed in him, and that he is trusted, and not altogether (although in confinement) deprived of his free and independent agency. I feel quite assured that a judicious liberality of this kind will be generally followed by the happiest curative results, and greatly conduce to the comfort and happiness of the patient. Patients should be permitted occasionally to attend divine worship out of the asylum, when circumstances do not contra-indicate this practice; they should be allowed also to walk out of the confines of the asylum, to attend places of amusement, visit scientific exhibitions; and the resident medical officer should make himself their friend and companion; thus inspiring them with confidence in his skill and kindly intentions, and reconciling them to the degree of moral restraint to which they may be unavoidably subjected."

still glaringly bad, and shows that old ideas, with respect to insanity, are not entirely obsolete. The Report of the Commissioners of Lunacy for 1856, relates circumstances which lead us back to the old days of Bedlam. Thus at Hanbury House the Commissioners found "one young lady fastened by webbing wristbands to a leathern belt; she was also tied down to her chair by a rope." Again, they found on their last visit to the Sandford Asylum, in December, 1855, "a patient just dead, his body exhibiting sores and extensive sloughs, arising necessarily, we think, from want of water-pillows or other proper precautions. The room has a stone or plaster floor, and is without a fire." It is, however, encouraging to find that, as far as personal restraint goes, the very worst of our private asylums are far superior to some of the best of the public asylums of France. Dr. Webster, our great authority on this point, gives in Dr. Winslow's Psychological Journal, the results gleaned in his visits to these establishments in the August and September of 1850 :—

"Forty male lunatics out of 1464 then resident were in *camisole* (strait-waistcoats), some being also otherwise restrained, thereby giving an individual in restraint to every 33¼ male inmates, or three per hundred. Amongst the female lunatics, again, the proportion was somewhat larger, 72 persons of that sex, out of the total 1902 resident patients, being under medical coercion; thus making one female in restraint to every 26⅛ inmates, or at the rate of 3·78 per cent. In contrast with this report respecting the above-named French provincial asylums, I would now place an official statement of the practice pursued at Bethlehem Hospital during the same period. At this establishment, where formerly the strait-waistcoat, with various kinds of personal coercion, were even in greater use than on the other side of the Channel, *not one* insane patient, among an average population of 391 lunatics, was under constraint of any description during the five weeks ending the 25th of September, when I first visited that institution after my return from the Continent, and which embraced the whole time referred to in this memorandum."

From these curious facts it will be seen that we are far in advance of our French, and, we may also add, of our other continental neighbours.* When the beneficent thought struck the great Pinel to knock off the fetters of the English captain,

* In Belgium, where many of the pauper lunatics are located in religious houses and are attended upon by the frères and sœurs of these establishments, it is not uncommon to find the patients at certain times of the day totally deserted and left to their own devices—the attendants being engaged in their religious duties!

he sounded a note which reverberated through Europe, and the poor insane captives issued from their dungeons in which they had been so long immured as the prisoners emerge from their prison to the divine strains of Beethoven's "Fidelio." But when this vast step was accomplished there still remained an immense amount of coercion scarcely less injurious than the old darkness and chains, and to Englishmen is mainly due the credit of abolishing it. Nor shall we rest where we are. It is our belief as well as our hope that, before another generation has gone by, the last vestige of restraint, in the shape of dismal airing-courts, and outside walls, which serve to wound the spirit rather than to enslave the limbs, will pass for ever among us, and only be remembered with the hobbles and the manacles of the past.

It has been asserted by some psychologists that lunacy is on the increase, and that its rapid development of late years has been consequent upon the increased activity of the national mind. This statement is certainly startling and calculated to arrest the attention of all thoughtful men. Is it true that civilisation has called to life a monster such as that which appalled Frankenstein? Is it a necessity of progress that it shall ever be accompanied by that fearful black rider which, like Despair, sits behind it? Does mental development mean increased mental decay? If these questions were truly answered in the affirmative, we might indeed sigh for the golden time when

"Wild in woods the noble savage ran,"

for it would be clear that the nearer humanity strove to attain towards divine perfection, the more it was retrograding towards a state inferior to that of the brute creation. A patient examination, however, of the question entirely negatives such a conclusion. Dr. Ray, of the United States, in taking the opposite view of the case, says :—

"If we duly consider the characteristics of our times, we shall there find abundant reason for the fact that insanity has been increasing at a rate unparalleled in any former period. In every successive step that has led to a higher degree of civilisation; in all the means and appliances for

developing the mental resources of the race; in the ever-widening circle of objects calculated to influence desire, and impel to effort, we find so many additional agencies for tasking the mental energies, and thereby deranging the healthy equilibrium which binds the faculties together, and leads to an harmonious result. The press and the rostrum, the railway and the spinning-jenny, the steam engine and the telegraph, republican institutions and social organizations, are agencies more potent in preparing the mind for insanity than any or all of those vices and casualties which exert a more immediate and striking effect."

Such is the burthen of the story of all those psychologists who believe that insanity is fast gaining upon us; but if "in the ever-widening circle of objects calculated to influence desire and impel to effort, we find so many additional agencies for tasking the mental energies, and thereby deranging the healthy equilibrium which binds the faculties together," it should appear that those classes of society which are in the van of civilization should be the chief sufferers. Bankers, great speculators, merchants, engineers, statesmen, philosophers and men of letters—those who work with the brain rather than with their hands,—should afford the largest proportion to the alleged increase of insanity. How does the matter really stand? In the Report of the Commissioners in Lunacy for the year 1847 we find the total number of private patients of the middle and upper classes then under confinement in private asylums, amounted to 4,649. Now, if we skip eight years, and refer to the Report of 1855, we find that there were only 4,557 patients under confinement, or about 96 less, notwithstanding the increase of population during that period. If we compare the number of pauper lunatics under confinement at these two different periods, we shall find a widely-different state of things; for in 1847 there were 9,654 in our public and private asylums, whilst in 1855 they numbered 15,822. In other words, our pauper lunatics would *appear* to have increased 6,170 in eight years, or upwards of 64 per cent. It is this extraordinary increase of pauper lunatics in the county asylums which has frightened some psychologists from their propriety, and led them to believe that insanity is running a winning race with the healthy intellect. But these figures, if they mean anything, prove that it is not the intellect of the country that

breeds insanity, but its ignorance, as it cannot be for one moment contended that the grent movements now taking place in the world originate with the labouring classes. We shall be told, we know, that there is a constant descent of patients from private asylums to the public asylums; that the professional man and the tradesman, after expending the means of his friends and family for a year or two, in the vain hope of a speedy cure, becomes necessarily in the end a pauper lunatic, and that this stream aids to swell the numbers in the county institution. Allowing its due weight to this explanation—and those who know public asylums are well aware how small, comparatively speaking, is the educated element—yet as the same disturbing element in the calculation obtained at both periods, we may safely conclude that the figures are not thereby essentially altered.

A still more convincing proof that mental ruin springs rather from mental torpidity than from mental stimulation, is to be found by comparing the proportion of lunatics to the population in the rural and the manufacturing districts. Sir Andrew Halliday, who worked out this interesting problem in 1828,* selected as his twelve non-agricultural counties—Cornwall, Cheshire, Derby, Durham, Gloucester, Lancaster, Northumberland, Stafford, Somerset, York (West Riding), and Warwick, which contained a population at that time of 4,493,194, and a total number of 3,910 insane persons, or one to every 1,200. His twelve agricultural counties were Bedford, Berkshire, Bucks, Cambridge, Hereford, Lincoln, Norfolk, Northampton, Oxford, Rutland, Suffolk, and Wilts, the total population of which were 2,012,979, and the total number of insane persons 2,526—a proportion of 1 lunatic to every 820 sane. Another significant fact elicited was, that whilst in the manufacturing counties the idiots were considerably less than the lunatics, in the rural counties the idiots were to the lunatics as 7 to 5! Thus the Hodges of England

* It may be as well to state that the Poor-Law Commissioners also worked out the problem with very similar conclusions in 1851, and that the investigations made by the Swedish Government into the condition of the insane in Norway in 1835 further corroborate the statement that insanity prevails to a greater extent in rural than in urban districts.

who know nothing of the march of intellect, who are entirely guiltless of speculations of any kind, contribute far more inmates to the public lunatic asylums than the toil-worn artisans of Manchester or Liverpool, who live in the great eye of the world, and keep step with the march of civilization, even if they do but bring up its rear. Isolation is a greater cause of mental ruin than aggregation—our English fields can afford *crétins* as plentifully as the upland valleys of the mountain range, seldom visited by the foot of the traveller; whilst, on the other hand, in the workshop and the public assembly, "As iron weareth iron, so man sharpeneth the face of his friend."

If we required further proof of the groundless nature of the alarm that mental activity was destroying the national mind, we should find it in the well-ascertained fact that the proportion of lunatics is greater among females than males. It may also be urged that Quakers, who pride themselves on the sedateness of their conduct, furnish much more than their share; but for this singular result their system of intermarriage is doubtless much to blame. Still the fact remains, that within a period of eight years, extending from 1847 to 1855, an increase of 64 per cent. took place in our pauper lunatic asylums. These figures, however, afford no more proof of the increase of pauper lunatics than the increase of criminal convictions since the introduction of a milder code of laws and the appointment of the new police afford a proof of increased crime. As the commissioners very justly observe, medical practitioners of late years have taken a far more comprehensive as well as scientific view of insanity than formerly; and many forms of the disease now fall under their care that were previously overlooked, when no man was considered mad unless he raved, or was an idiot. But the great cause of the increase of lunatics in our asylums is to be ascribed to the erection of the asylums themselves. With the exception of three or four Welsh counties, and two or three in the north of England, there is not a shire in England which does not possess some palatial building. These establishments, in which restraint, speaking in the ordinary acceptance of the term, is unknown, and in which the inmates are always treated with

humanity, have drained the land of a lunatic population which before was scattered among villages or workhouses, amounting, according to the computation of the commissioners, to upwards of 10,500—just as the deep wells of the metropolitan brewers have drained for miles around the shallow wells of the neighbourhood in which they are situated. For the same reason the number of lunatic paupers has declined in registered hospitals since 1847 from 384 to 185, and in "licensed houses" from 3,996 to 2,313. Upon the whole, we may safely predict that, when these disturbing causes have ceased to act, the annual returns of the commissioners will show that, as the treatment of insanity is every day better understood, so the pauper lunatics in our public asylums, instead of increasing in a ratio far beyond that of the general population, show a diminished proportion. Already there are symptoms that the flood is returning to its proper level; for while the lunatics of all classes in the public asylums, licensed houses, and in the Royal Hospital at Haslar, were 20,493 in 1855, they had only advanced in 1856 to 20,764, which is an increase in the twelvemonth of but 271.

THE LONDON COMMISSARIAT.

If, early on a summer morning before the smoke of countless fires had narrowed the horizon of the metropolis, a spectator were to ascend to the top of St. Paul's, and take his stand upon the balcony, that with gilded rail flashes like a fringe of fire upon the summit of the dome, he would see sleeping beneath his feet the greatest camp of men upon which the sun has ever risen. As far as he could distinguish by the morning light he would behold stretched before him the mighty map of the metropolis; and could he ascend still higher, he would note the stream of life overflowing the brim of hills which enclose the basin in which it stands.

In the space swept by his vision would lie the congregated habitations of two millons and a half of his species—but how vain are figures to convey an idea of so immense a multitude. If Norway, streching from the Frozen Ocean down to the southern extremity of the North Sea, were to summon all its people to one vast conclave, they would number little more than half the souls within the London bills of mortality. Switzerland, in her thousand valleys, could not muster such an army; and even busy Holland, within her mast-thronged harbours, humming cities, and populous plains, could barely overmatch the close-packed millions within sound of the great bell at his feet. As the spectator gazed upon this extraordinary prospect, the first stir of the awakening city would gradually steal upon his ear. The rumbling of wheels, the clang of hammers, the clear call of the human voice, all deepening by degrees into a confused hum, would proclaim that the

mighty city was once more rousing to the labour of the day, and the blue columns of smoke climbing up to heaven that the morning meal was at hand. At such a moment the thought would naturally arise in his mind,—In what manner is such an assemblage victualled? By what complicated wheels does all the machinery move by which two millions and a half of human beings sit down day by day to their meals as regularly and quietly as though they only formed a sung little party at Lovegrove's on a summer's afternoon? As thus he mused respecting the means by which the supply and demand of so vast a multitude is brought to agree, so that every one is enabled to procure exactly what he wants, at the exact time, without loss to himself or injury to the community, thin lines of steam, sharply marked for the moment, as they advanced one after another from the horizon and converged towards him, would indicate the arrival of the great commissariat trains, stored with produce from all parts of these isles and from the adjacent continent. Could his eye distinguish in addition the fine threads of that far-spreading web which makes London the most sensitive spot on the earth, he would be enabled to take in at a glance the two agents—steam and electricity—which keep the balance true between the wants and the supply of London.

If our spectator will now descend from his giddy height, and will accompany us among the busy haunts of men, we will attempt to point out to him whence those innumerable commodities, which he has seen pouring into the town, have been obtained, the chief marts to which they are consigned, and the manner in which they are distributed from house to house. Had London like Paris its *octroi*, the difficulty of our task would be limited to the mere display of official figures, but, thanks to a free policy, we have no such means of getting at strictly accurate estimates, and must therefore content ourselves with the results of patient inquiry among the foremost carriers —the railway companies—aided by such other information as we have been able to procure. For the sake of convenience, and of sequence, let us imagine that the principal daily meal is

proceeding, and, according to the order of the courses, we will endeavour to trace the various edibles to their source—the fish to its sea—the beast to its pasture—the wild animal to its lair—the game to its cover—and the fruit to its orchard; to point out how they are netted, fattened, bagged, gathered, and conveyed to their ultimate destination—the *great red lane of* London humanity. Let us begin with fish, and that unrivalled fish-market which all the world is aware rears its head by London Bridge.

Those who remember old Billingsgate, with its tumble-down wharf, and dock half choked with corruption and oyster-shells—a dirty remnant of the days of Elizabeth—will enter with pleasure Mr. Bunning's new market. Through its Italian colonnade are seen the masts of the fishing smacks, and the brown wharves of the opposite side—a pleasing picture, which instantly fixes the artistic eye. The busy scene within the market between the hours of five and seven in the morning, is one of the marvels of the metropolis. Billingsgate is the only wholesale fish-market in London, and it may therefore be imagined how great must be the business transacted within its walls. Of old, nine-tenths of the supply came by way of the river, the little that came by land being conveyed from the coast, at great expense, in four-horse vans. Now the railways are day by day supplanting smacks, and in many cases steamers; for by means of its iron arms, London, whilst its millions slumber, grasps the produce of every sea that beats against our island coast, and ere they have uprisen it is drawn to a focus in this central mart. Thus every night in the season the hardy fishermen of Yarmouth catch a hundred tons (12,081 yearly), principally herring, which, by means of the Eastern Counties Railway, are next morning at Billingsgate. The South-Western Railway sends up annually, with the same speed, 4,000 tons of mackerel and other fish, the gatherings of the south coast. The North Western collects over night the "catch" from Ireland, Scotland, and the north-east coast of England, and adds to the Thames-street mart 3,578 tons, principally of salmon, whilst the Great Northern delivers to the early morning market, or sometimes later in

the day, 3,248 tons of like sea produce. The Great Western brings up the harvest of the Cornish and Devonshire coasts, chiefly mackerel and pilchards, to the amount of 1,560 tons in the year; and the Brighton and South Coast conveys the incredible number of 15,000 bushels of oysters, besides 4,000 tons of other fish. Nearly one-half in fact of the fish-supply of London, instead of following as of old the tedious route of the coast, is hurried in the dead of night across the length and breadth of the land to Billingsgate, and, before the large consumers in Tyburnia and Belgravia have left their beds, may be seen either lying on the marble slabs of the fishmongers, or penetrating on the peripatetic barrow of the costermonger into the dismal lanes and alleys inhabited by "London Labour and the London Poor." These prodigious gleanings from what Goldsmith might well call the "finny deep," are conveyed from the termini in spring-vans, drawn by two and occasionally by four horses. Salmon comes in boxes, herrings in barrels, and all other kinds of fish in baskets. Sometimes as many as sixty of these vans will arrive in the narrow street leading to the market in the course of two or three hours, and the scene of confusion occasioned by their rushing among the fishmongers' carts and the costermongers' barrows, the latter often amounting to more than a thousand, is almost as great as that at Smithfield; for the fish, like the live-stock trade, has long outgrown its mart: and Billingsgate, as much as Smithfield, is choked for want of space. Let the visitor beware how he enters it in a good coat, for, as sure as he goes in in broad cloth, he will come out in *scale* armour. They are not polite at Billingsgate, as all the world knows, and "by your leave" is only a preliminary to your hat being knocked off your head by a bushel of oysters or a basket of crabs. In the early part of the morning, the traffic is carried on in comparative quiet, for the regular fishmongers, who have the first of the market, conduct their business with little disturbance, but it would gladden the heart of a Dutch painter to see the piled produce of a dozen different seas glittering with silver and brilliant with colour. Gigantic salmon, fresh caught from the firths and bays of Scotland, or from the pro-

ductive Irish seas, flounder about, as the boxes in which they have travelled disgorge them upon the board. Quantities of delicate red mullet, that have been hurried up by the Great Western, all the way from Cornwall, for the purpose of being furnished fresh to the fastidious palates at the West End; smelts brought by the Dutch boats, their delicate skins varying in hue like an opal as you pass; pyramids of lobsters, a moving mass of spiteful claws and restless feelers, savage at their late abduction from some Norwegian fiord; great heaps of pinky shrimps; turbots, that lately fattened upon the Doggerbank, with their white bellies bent as for some tremendous leap; and humbler plaice and dabs, from our own craft—all this bountiful accumulation forms a mingled scene of strange forms and vivid colours, that no one with an eye for the picturesque can contemplate without interest. Neither is the scene always one of still life, for it is no rare occurrence for the visitor to behold a yelling knot of men dragging with ropes through the excited crowd a royal sturgeon, nine feet in length. If the spectator now peeps down the large square opening into the dismal space below, which appears like the hold of a ship lately recovered from the deep, he will see the shell-fish market, where piles of blue-black muscles, whelks, and grey cockles turned up with yellow, give the place a repulsive aspect of dirt and slop. There are but few buyers seen here, and they are generally women belonging to the costermonger class, for the men rather disdain the shell-fish trade. These female itinerants may be noticed wandering about from basket to basket, occasionally gouging out a whelk from the shell with the thumb, to test the lot, and then passing on to the next.

Busiest among the busy is seen the "Bommeree," or middleman—sometimes called the forestaller. The province of this individual is to purchase the fish as it comes into the market, and divide it into lots to suit large and small buyers, separating the qualities according as they are designed for St. James's or St. Giles's. These worthies used at one time to forestal the market extensively, when they felt certain, from the state

of the tide, that no fish supplies could be poured in for the day, but now the railway defeats their tactics, and the utter uncertainty of the arrivals has done away with this branch of their business. After the "trade" has been supplied, and the serge-aproned "regulars" have loaded their light spring carts, there comes, especially in certain fish seasons, an eruption of purchasers of a totally different character—the costermongers of streets. This nomade tribe, which wanders in thousands from market to market, performs a most important part in the distribution of food. They are for the greater part the tradesmen of the poor, and by their energy and enterprise secure to our working-classes many of the fruits of both sea and land, which they would never taste but for them. About seven o'clock the army of street-vendors, foot and "donkey," for the greater number rattle up in barrows drawn by that useful animal, begin visibly to change the whole hue and appearance of the place. Young fellows in fustian coats and Belcher handkerchiefs throng the market, and board the smacks, "chaffing," higgling, joking, and swearing—but never fighting, for the costermonger has too much to do at present to make physical demonstrations. Among the most eager of the itinerant salesmen the visitor speedily distinguishes the Judaic nose. The Hebrews, who are in great force about this neighbourhood on account of the dried-fruit trade, which is mainly in their hands, deal largely also in fish. The poorer members of the fraternity purchase the bigger portion of the fresh-water supply, such as plaice, roach, dace, &c., in fact, nearly everything caught by the Wandsworth fisherman, whose picturesque "bawley" boats, which often contain both his family and fortune, may generally be seen moored in the stream between Battersea reach and Kew bridge, a mass of brown nets and umber canopies lit up by the brilliant red caps of their owners, just such as Constable loved to paint in the foregrounds of his landscapes. These fish, if not alive, must at least retain the spasmodic quivering of the flesh which remains immediately after death, or the Jews will not buy, for reasons we suppose connected with their religion, since their chief trade is among

the rich and poor of their own people. The Wandsworth fishermen also supply all the white-bait that is consumed at Greenwich and Blackwall: it is caught generally between the latter place and Woolwich at night, and it is singular that a fish which is among the most delicate we have, should flourish in one of the foulest parts of the foulest river in Europe. The area of the market, as soon as the costermongers appear, speedily becomes broken up into numbers of little circles, strictly intent upon the eye of individuals who take up a position high over their heads upon the boards or stands. These are the salesmen, disposing by auction of the fish consigned to them. Some of the dealers are moneyed men, and will lay out their fifty pounds of a morning, re-selling to their fellows again at a profit. The smaller capitalists combine in threes and fours, and thus manage to get their commodities at wholesale prices. The activity of the market mainly depends upon the season of the year and the amount of fish. The energy of these peripatetics is surprising: they look in at Billingsgate, and if the supply runs short they are off again immediately to Covent Garden, for they deal in everything, and the barrow that one morning you see filled with fresh herrings, the next is blooming with plums. If, on the contrary, a large cargo of sprats comes suddenly into London, or if soles should be unusually plentiful, it is known in an incredibly short space of time all over the town, and they flock to the market in thousands; as many as five thousand is the usual attendance on such occasions. These costermongers absorb more than a third of the whole Billingsgate supply; of sprats and fresh herrings they take fully two-thirds. Turbot and all the costlier fish they purchase sparingly, but they buy largely when it chances to be cheap, as in the cholera year of 1849, when prime salmon went a-begging at four-pence a pound! If the market is dull, and prices are high, the fact is speedily known, and the cry of "No smacks at the Gate," is sufficient to turn the current immediately in the direction of the "Garden."

Steam, as we have already intimated, has revolutionized the

fish-trade, and is rapidly sweeping away the whole fleet of smacks propelled by sails, as ruthlessly as the rail did stage-coaches. A few years ago all the oysters were brought by water to Billingsgate; but a short time since a great natural bed, called the Mid Channel Bed, which stretches for forty miles between the ports of Shoreham and Havre, was discovered, and, the dredging-ground being free to all comers, a vast field of wealth has been opened to fishermen, especially as from the proximity of the Brighton and South Coast Railway the produce can be sent immediately to town, and escape the dues of metage and other tolls to which all fish landed at the market is liable. Seaborne oysters are thus placed at a great disadvantage, and the different companies owning them justly complain at a city exaction which takes a large sum annually out of their pockets, besides the charge for porterage it entails upon the purchasers. Mr. Alston, who is, without doubt, the largest oyster-fisher in the world, sent up in one year between 40,000 and 50,000 bushels from his fishery, Cheyney Rock, near Sheerness, and paid 800*l.* for metage. The whole trade paid no less than 3,000*l.*, and this for services which their own men could do as well as themselves, were it not for a custom which enforces idleness upon the smack people.*

The "scuttle-mouths," as they are termed from their huge shell, pay no attention to season, and consequently oyster-day has now in a great degree lost its significance. The 4th of August is still, it is true, the opening day at Billingsgate, but the supply from without has taken the wind out of its sails. Only those who have witnessed the crowds filling all the streets

* If the spectator, while leaning over the rail of the wharf and watching "Oyster Street," as the costermongers call the line of oyster-boats moored side by side, has ever been at a loss to understand why it is that in the very height of the market, when the decks are crowded with purchasers, the sailors are seen hanging about the boats, or seated upon the bulwarks, taking their morning pipes, whilst the duty of measuring and carrying the oysters is being performed by the "Fellowships" belonging to the corporation of London, he will now know the reason. Steam will, however, surely abolish many of these city abuses, and rail-borne oysters will lend their powerful aid to rail-borne coal in abolishing regulations which are not in accordance with the emancipated spirit of the age.

leading to the market long before the hour of business—six o'clock in the morning—can understand the eagerness exhibited of old to obtain some of the first day's oysters. All this is now gone. There were not more than eighteen smacks at the opening of the present year, and, few as were the arrivals, the buyers were not eager. The Mid-Channel oysters, which have thus disturbed the old trade, are of a large and by no means delicate kind, such as come from Tenby, Jersey, &c.—coarse fish, eaten by rough men—third-class oysters, in fact, which rarely penetrate to the West End, unless to make sauce. Real natives are greater aristocrats among their fellows than ever; the demand for them has for a long time far exceeded the supply, and the price has consequently risen. Of the birth, parentage and nurture of this delicate fish, a curious tale could be told. Designed for fastidious palates, much care and attention is bestowed upon its breeding. The *habitué* of the Opera, who strolls up the brilliantly lighted Haymarket towards midnight, and turns into any one of the fish supper-rooms that line its western side, little dreams of the organization at work to enable him to enjoy his native. Most of the oysters, with the exception of the Mid-Channel bed, are regularly cultivated by different companies, who rear and tend them at different parts of the south coast, and of the Thames at its mouth. Of these companies there are nine, in addition to individuals who possess and work what might be called sea-farms, several of which are miles in extent. In all the beds there is a certain space dedicated to natives. At Burnham, Essex, the "spat," or fecundated sperm, is stored in large pits, and sold as native brood, which is afterwards "laid" in that portion of the different beds appropriated to privileged oysters. Here the young natives remain for three years, when they are generally brought to market. So far their education is left, in a certain degree, to nature; but once in the possession of the fish-shopkeepers, art steps in to perfect their condition. They are now stored in large shallow vats, being carefully laid with their proper sides uppermost, and supplied daily with oatmeal: a process which is calculated rather to fatten than to flavour, and there are many

who think that, like show cattle, they are none the better for over-feeding. "Natives," packed in barrels, form one of the articles of food that is largely sent out of London into the country, as all persons know who travel much at Christmas time, and notice with astonishment the pyramids of oyster-barrels which crowd the platforms of all the termini of the metropolis.

The frying-pans of London are mainly supplied with soles all the year round by the trolling-boats of Barking, of which there are upwards of 150 belonging to different companies. They fish the North Sea off the coasts of Yorkshire and Holland, particularly the Silver and Brown banks. Of old the smacks used to carry their own catch to Billingsgate, but the loss of time was so great, that latterly fast-sailing cutters have been employed to attend upon the fishing-smacks and bring their produce to market packed in ice. Of this splendid craft, which can sail almost in the eye of the wind, there are forty; and the total number of seamen employed is not less than 2,000, the greater part of whom have been taken as boys from the work-house, and trained by this capital service into first-rate seamen. It is curious to follow the small proceedings of the world into their ultimate results. The gastronome, smiling complacently as he withdraws the cover and reveals a well-browned pair of soles, would never guess that they and their kind are the immediate cause of a happy transmutation of parish burthens into the right arm of our strength. Eels are constantly imported to Billingsgate by the Dutch boats. The galliots never moor close alongside the wharf, as the wells in which they bring their fish alive cause them to draw too much water, but they anchor midway in the stream, by twos and threes—their brown sides, flat bows, with high cheek-bones, like their navigators, and bright verd-green rudders, adding to the picturesque appearance of the river. The great fat creatures brought by them mainly supply the eel-pie houses, and contribute largely, we are informed, to that oleaginous kind of soup which people too hungry to be curious mistake for veritable oxtail and calves' head. The Dutch boats do not, however, confine themselves to eels. They

deal in turbot, soles, and all kinds of flat-fish, such as frequent the Dogger Bank, much to the discredit of our native enterprise, neglecting, as we do, the splendid deep-sea fishing-ground off the south-west coast of Ireland, where cod and salmon are to be found in abundant quantities, whilst those who know the west coast well, declare there is turbot enough in Galway Bay "to supply the whole of Europe for the next hundred years."

We believe, however, it is now in contemplation to go to work upon a large scale in those waters, having screw-steamers to collect the produce, and bring it to Milford Haven alive in wells, from which port it would come, *viâ* the South Wales and Great Western Railways, to Billingsgate, within twenty-four hours after it was caught. The value of screw steamers having capacious wells has been fully tested by Mr. Howard, of Manningtree, Essex, who fitted an engine and screw into one of his welled fishing-smacks. Scarcely a lobster, out of twenty thousand put alive into the boat, was lost, whilst large numbers of those brought in sailing smacks perish. Salmon, cod, and other fish, are brought alive with the same success in the welled steamers from the North Sea and the coast of Scotland. It is almost time that some new ground were found in place of the famous Dogger Bank, which has now been preyed upon by so many nations for centuries, and has supplied so many generations of Catholics and Protestants with fast and feast food. No better proof that its stores are failing could be given than the fact that, although the ground, counting the Long Bank and the north-west flat in its vicinity, covers 11,800 square miles, and that in fine weather it is fished by the London companies with from fifteen to twenty dozen of long lines, extending to ten or twelve miles, and containing from 9,000 to 12,000 hooks, it is yet not at all common to secure even as many as four score fish of a night—a poverty which can be better appreciated when we learn that 600 fish for 800 hooks is the catch for deep-sea fishing about Kinsale.

Towards the latter end of August the great herring season commences. Yarmouth is the chief seat of this branch of the piscatory trade. Every night when the weather is fine the

fishermen of this old port "shoot" upwards of 300 square miles of net. Neptune in his ample arms never gave the ocean so magnificent an embrace. The produce of this wholesale sweeping of the sea is brought to town by the Eastern Counties Railway. They come up to Billingsgate packed in barrels and in bulk, and the number sold in the year seems almost fabulous, being upwards of a *billion*. Next to the herring fishery the sea-harvest of most importance to the poor of London is that of sprats, which come in about Lord Mayor's Day, and it is a popular belief that the first dish is always sent to the chief magistrate of the city. If a telegraph were to be laid down to all the alleys and courts, the fact of a large arrival of these little creatures at Billingsgate would not be sooner made known to the lower orders than, by some mysterious process, it is at present. Mr. Goldham, the clerk of the market, accustomed as he is to the sudden invasions of the costermongers, informs us that the scene on board the smacks laden with sprats is really frightful. The people hang thick as sea-weed from the rigging, throng the decks, and swarm on every available inch of plank, until the wonder is that the whole of the puny fleet does not capsize with the weight. The cause of the scramble is that the street sellers will not buy until they have seen the sample, and every one consequently tries to gain the highest point, that he may look down into the hold, whilst a man tumbles about the sprats with a shovel, in silver showers. The plaice season succeeds to that of sprats, with the interval of mackerel, which continues until the end of May, when Scotland and Ireland begin to pass down their salmon into the market. But where do all the lobsters come from? The lovers of this most delicious of the crustaceæ tribe will probably be astonished to learn that they are mainly brought from Norway. France and the Channel Islands, Orkney, and Shetland, do, it is true, contribute a few to the metropolitan market, but full two-thirds are reluctantly, and with much pinching and twisting, dragged out of the thousand rock-bound inlets which indent the Norwegian coast. They are conveyed alive in a screw-steamer and by smacks, in baskets, sometimes to the extent of 20,000 of a night,

to Great Grimsby, and are thence forwarded to town by the Great Northern Railway—another 10,000 arriving perhaps from points on our own and the French coast. The fighting, twisting, blue-black masses are taken as soon as purchased to what are termed the "boiling-houses," of which there are four, situated in Duck and Love Lanes, close to the market; and here, for a trifling sum per score, they change their dark for scarlet uniforms. They are plunged into the boiling cauldron, basket and all, and in twenty minutes they are done. Crabs are cooked in the same establishments, but their nervous systems are so acute, that they dash off their claws in convulsive agony if placed alive in hot water. To prevent this mutilation, which would spoil their sale, they are first killed by the insertion of a needle through the head. The lobster trade is mostly in the hands of one salesman, Mr. Saunders, of Thames Street, who often has upwards of 15,000 consigned to him of a morning, and who causes no less than 15,000*l.* a year to flow into the fishy palms of Norwegians for this single article of commerce. As to the total supply of fish to the London market, we borrow the following estimate from Mr. Mayhew's very clever book on "London Labour and the London Poor." The figures seemed to us at first sight so enormous, that we hesitatingly submitted the table to one of the largest salesmen who assured us that it was no over-statement:—

Description of Fish.	*No. of Fish.*	*Weight of Fish.*
WET FISH.		lbs.
Salmon and salmon trout (29,000 boxes, 14 fish per box)	406,000	3,480,000
Live cod (averaging 10 lbs. each)	400,000	4,000,000
Soles (averaging ¼ lb. each)	97,520,000	26,880,000
Whiting (averaging 6 oz. each)	17,920,000	6,720,000
Haddock (averaging 2 lbs. each)	2,470,000	5,040,000
Plaice (averaging 1 lb. each)	33,600,000	33,600,000
Mackerel (averaging 1 lb. each)	23,520,000	23,520,000
Fresh herrings (250,000 barrels, 700 fish per barrel)	175,000,000	42,000,000
Ditto in bulk	1,050,000,000	252,000,000
Sprats	..	4,000,000

Description of Fish.	*No. of Fish.*	*Weight of Fish.*
		lbs.
Eels from Holland (principally), England, and Ireland (6 fish per lb.).	9,797,760	1,505,280 127,680
Flounders (7,200 qrtns., 36 fish per qtn.)	259,200	43,200
Dabs (7,500 qrtns., 36 fish per qrtn.)	270,000	48,750
DRY FISH.		
Barrelled cod (15,000 barrels, 40 fish per barrel)	750,000	4,200,000
Dried salt cod (5 lbs. each)	1,600,000	8,000,000
Smoked haddock (65,000 barrels, 300 fish per barrel)	19,500,000	10,920,000
Bloaters (265,000 baskets, 150 fish per basket)	147,000,000	10,600,000
Red herrings (100,000 barrels, 500 fish per barrel)	50,000,000	14,000,000
Dried sprats (9,600 large bundles, 30 fish per bundle)	288,000	96,000
SHELL FISH.		
Oysters	495,896,000	..
Lobsters (averaging 1 lb. each fish)	1,200,000	1,200,000
Crabs (averaging 1 lb. each fish)	600,000	600,000
Shrimps (324 to a pint)	498,428,648	..
Whelks (227 to half bushel)	4,943,200	..
Mussels (1,000 to half bushel)	50,400,000	..
Cockles (2,000 to half bushel)	67,392,000	..
Periwinkles (4,000 to half bushel)	304,000,000	..

And now for the *pièce de résistance.*

London has always been celebrated for the excellence of its meat, and her sons do justice to it; at least it has become the universal impression that they consume more, man for man, than any other town population in the world. It was a sirloin, fresh and ruddy, hanging at the door of some Giblett or Slater in a former century, that inspired, we suspect, the song which ever since has stirred Englishmen in a foreign land, "The Roast Beef of Old England." The visitor accustomed to the markets of our large provincial towns would doubtless expect to find the emporium of the live-stock trade for so vast a population of an imposing size. The foreigner, after seeing the magnificence of our docks—the solidity and span of our bridges—might naturally look for a national exposition of our greatness in the

chief market dedicated to that British beef which is the boast of John Bull. What they do see in reality, if they have courage to wend their way along any of the narrow tumble-down streets approaching to Smithfield, which the great fire unfortunately spared, is an irregular space bounded by dirty houses and the ragged party-walls of demolished habitations, which give it the appearance of the site of a recent conflagration—the whole space comprising just six acres, fifteen perches, roads and public thoroughfares included. Into this narrow area, surrounded with slaughter-houses, triperies, bone-boiling houses, gut-scraperies, &c., the mutton-chops, scrags, saddles, legs, sirloins, and rounds, which grace the smiling boards of our noble imperial capital throughout the year, have, for the major part, been goaded and contused for the benefit of the civic corporation installed at Guildhall.* The best time is early in the morning—say one or two o'clock of the "great day," as the last market before Christmas-day is called. On this occasion, not only the space—calculated to hold 4,100 oxen and 30,000 sheep, besides calves and pigs—is crammed, but the approaches around it overflow with live stock for many hundred feet, and sometimes the cattle are seen blocking up the passage as far as St. Sepulchre's church. If the stranger can make his way through the crowd, and by means of some vantage-ground or door-step can manage to raise himself a few feet above the general level, he sees before him in one direction, by the dim red light of hundreds of torches, a writhing party-coloured mass, surmounted by twisting horns, some in rows, tied to rails which run along the whole length of the open space, some gathered together in one struggling knot. In another quarter, the moving torches reveal to him now and then, through the misty light, a couple of acres of living wool, or roods of pigs' skins. If he ventures into this closely wedged and labouring mass, he is enabled to watch more narrowly the reason of the universal ferment among the beasts.

The drover with his goad is forcing the cattle into the

* Since this was written, the new market in Copenhagen Fields has been opened, and a totally different state of things now obtained.

smallest possible compass, and a little further on half a dozen men are making desperate efforts to drag refractory oxen up to the rails with ropes. In the scuffle which ensues the slipping of the ropes often snaps the fingers of the persons who are conducting the operation, and there is scarce a drover in the market who has not had some of his digits broken. The sheep, squeezed into hurdles like figs into a drum, lie down upon each other, "and make no sign;" the pigs, on the other hand, cry out before they are hurt. This scene, which has more the appearance of a hideous nightmare than a weekly exhibition in a civilised country, is accompanied by the barking of dogs, the bellowing of cattle, the cursing of men, and the dull blows of sticks—a charivari of sound that must be heard to be appreciated. The hubbub gradually abates from twelve o'clock at night, the time of opening, to its close at 3 P.M. next day; although during the whole period, as fresh lots are "headed up," individual acts of cruelty continue. Can it excite surprise that a state of things, the worst details of which we have suppressed, because of the pain which such horrors excite, sometimes so injures the stock that, to quote the words of one of the witnesses before the Smithfield Commission, "a grazier will not know his own beast four days after it has left him?" The meat itself suffers in quality; for anything like fright or passion is well known to affect the blood, and consequently the flesh. Beasts subjected to such disturbances will often turn green within twenty-four hours after death. Mr. Slater, the well-known butcher of Kensington and Jermyn-street, states that mutton is often so disfigured by blows and the goad, that it cannot be sold for the West-end tables. Many of the drovers we doubt not are ruffians, but we believe the greater part of this cruelty is to be ascribed to the market-place itself, which, considering the immense amount of business to be got through on Mondays and Fridays, is absurdly and disgracefully confined. According to the official account, the number of live stock exhibited in 1853 was—

Oxen.	Sheep.	Calves.	Pigs.	Total.
294,571	1,518,040	36,791	29,593	1,893,388

But this is far from giving a true idea of the whole amount brought into London. Much stock arrives in the capital which never enters the great mart. For example, Mr. Slater, who kills per week, on the average, 200 sheep and from 20 to 25 oxen, says, in his evidence before the Smithfield Commission, that he buys a great deal of his stock from the graziers in Norfolk and Essex. Again, "town" pigs are slaughtered and sent direct to the meat market, while many sheep are bought from the parks, where they have been temporarily placed till they find a purchaser. A much more correct estimate of the flocks and herds which are annually consumed in London may be gathered from a report of the numbers transmitted by the different lines of railway, compiled from official sources by Mr. Ormandy, the cattle-traffic manager of the North-Western Railway. From this able pamphlet we extract the following table:—

	Oxen.	*Sheep.*	*Calves.*	*Pigs.*	*Total for* 1853.
By Eastern Counties . . .	81,744	277,735	3,492	23,427	386,398
„ L. & N. Western . . .	70,435	248,445	5,113	24,287	348,280
„ Great Northern	15,439	120,333	563	8,973	145,308
„ Great Western	6,813	104,607	2,320	2,909	116,649
„ L. & S. Western	4,885	100,960	1,781	516	108,142
„ South Eastern	875	58,320	114	142	59,451
„ L. & B. & S. Coast . . .	863	13,690	117	54	14,724
„ Sea from North of England and Scotland	14,662	11,141	421	3,672	29,896
„ Sea from Ireland . . .	2,311	3,472	21	5,476	11,280
Imported from the Continent .	55,065	229,918	25,720	10,131	320,834
Driven in by road, and from the neighbourhood of the metropolis (obtained from the toll-gate lessees)	69,096	462,172	62,114	48,295	641,647
Total . . .	322,188	1,630,793	101,776	127,852	2,182,609

These numbers show at a glance what a part the railway plays in supplying animal food to the metropolis, and how trifling in comparison is the amount that travels up on foot. The Eastern Counties lines, penetrating and monopolizing the rich breeding and fattening districts of Norfolk and Essex, bring up the largest share. Many of the little black cattle, that tourists see in Scotland climbing the hills like cats, come directly from these counties, having some months before been

sent thither from their native north to clothe their bones with English substance. By the same line we receive a fair portion of that great foreign contribution to our larders, the mere shadow of which so frightened our graziers some years ago, principally Danish stock, which finds its way from Tonning to Lowestoff, a route newly opened up by the North of Europe Steam-ship Company. The North-Western is next in rank as a carrier of live stock. This line takes in the contributions from the Midland Counties, and, by way of Liverpool, abundance of Irish and Scotch cattle. The Great Northern is perhaps destined to surpass both in the quantities of food it will eventually pour into London, running as it does through the northern breeding districts, and receiving at its extremity the herds which come from Aberdeen and its neighbourhood.

The foreign supply last year of cattle, sheep, pigs, and calves, was more than a seventh of the entire number sent to London. The daily bills of entries at the Custom House furnishes us with a valuable indication of the fields from which we have already received, and may in future expect to receive still further additions of what Englishmen greatly covet—good beef and mutton at a moderate price. The arrivals by steam in the port of London in 1853 were as follows:—

From	*Oxen.*	*Sheep.*	*Calves.*	*Pigs.*	*Total.*
Holland . . .	40,538	172,730	24,280	9,370	246,918
Denmark . . .	9,487	7,515	60	..	17,062
Hanseatic Towns .	4,366	37,443	1	632	42,442
Belgium . . .	449	12,006	1,244	..	13,699
France . . .	105	224	135	129	593
Portugal . . .	100	..	..	..	100
Spain . . .	17	..	..	..	17
Russia . . .	3	..	..	..	3
Total . .	55,065	229,918	25,720	10,131	320,834

Holland, Denmark, and the Hanseatic Towns, it will be seen, were the principal contributors. A more striking example of the influence of the legislation of one country in modifying the

occupations of the people of another could not be cited, than the manner in which Sir Robert Peel's tariff revolutionized the character of Danish and Dutch farming. Before 1844 the pastures of the two countries, more especially the rich marshes of Holland, were almost exclusively devoted to dairy purposes: the abolition of the duty on live stock in that year quickly introduced a new state of things. The farmers began to breed stock, and consequently turnips and mangel-wurzel have been creeping over fields, where once the dairy-maid carried the milking-pail, as gradually as one landscape succeeds another in the Polytechnic dissolving views. We get now from both countries excellent beef, especially from Jutland, whose lowing herds used formerly to go to Hamburg—and who has not heard of the famous Hambro' beef? We may expect in time to receive still finer meat from this quarter, for the Danes have been sedulously improving their breed, and agriculturists, who saw the beasts which were sent over to the last Baker-street show, admitted that they were in every respect equal to our own short-horns. It is gratifying to note how ready the world is to follow our lead in the matter of stock-breeding. Bulls are bought up at fabulous prices by foreigners, and especially by our cousins on the other side of the Atlantic, for the purpose of raising the indigenous cattle to the British standard. An American, for instance, purchased, for 1,000*l.*, a celebrated bull bred by Earl Ducie, though unfortunately the animal broke his neck on his passage out. Another noble specimen was secured, we have heard, for the same quarter, for 600*l.*

The supply of sheep and lambs has, during the last twenty years, stood nearly still; for in 1828 there were brought to market 1,412,032, and in 1849 but 1,417,000, or only an extra 4,000 for the 500,000 mouths which have been added to the metropolis between these two periods. That London has of late years abjured mutton, as our immediate ancestors appear to have done pork, the evidence of our senses denies. How, then, are we to explain this stagnation in the Smithfield returns? By the fact that a new channel has been found in the rapid rise of Newgate market, the great receptacle of

country-killed meat brought up to town by the railways. Those who remember the place forty years ago state that there were not then twenty salesmen, and now there are two hundred. This enormous development is due to steam, which bids fair to give Newgate, in the cold season at least, the lead over Smithfield. The new agent has more than quadrupled the area from which London draws its meat. Twenty years ago eighty miles was the farthest distance from which carcases ever came; now the Great Northern and North-Western railways, during the winter months, bring hundreds of tons from as far north as Aberdeen, whilst some are fetched from Hamburgh and Ostend. Country slaughtering will in time, we have little doubt, deliver the capital from the nuisances which grow out of this horrible trade. Aberdeen is in fact becoming little else than a London *abattoir*. The style in which the butchers of that place dress and pack the carcases leaves nothing to be desired, and in the course of the year mountains of beef, mutton, pork, and veal arrive the night after it is slaughtered in perfect condition. According to returns obligingly forwarded to us by the different railway companies, we find that the following was the weight of country-killed meat by the undermentioned lines :—

	Tons.
Eastern Counties	10,398
North-Western	4,602
Great Western	5,200
Great Northern	13,152*
South-Eastern	1,035
South-Western	2,000
Brighton and South Coast	100
	36,487

Thus no less than 36,487 tons of meat are annually "pitched" at Newgate and Leadenhall markets. As the Scotch boats convey about 700 tons more, we have at least 37,187 tons of country-killed meat brought into London by steam, and these immense contributions are totally independent of the amount slaughtered at Smithfield, which is estimated to average weekly 1,000 oxen, 3,000 sheep and lambs, and 400 calves and pigs. We have

* This return contains some small proportion of game, the quantity of which is not stated.

given the average supply; but on some occasions the quantity is enormously increased. The Eastern Counties line during one Christmas week deposited at Newgate about 1,000 tons of meat; and the weight sent by other companies on the same day would be proportionately large. No less than forty waggons were waiting on one occasion to discharge their beef and mutton into the market. And what does our reader imagine may be the area in which nine-tenths of this mass of meat are sold? Just 2 roods 45 perches, having one carriage entrance, which varies from 14 to 18 feet in width, and four foot entrances, the widest of which is only 16 feet 6 inches, and the narrowest 5 feet 8 inches. No wonder that, as we are informed by more than one of the witnesses before the Smithfield Inquiry Commission, there is often not sufficient space to expose the meat for sale, and it becomes putrid in consequence. Though we have acquired the fame of being a practical people, it must be confessed that we conduct many of our every-day transactions in a blundering manner, when we cannot provide commodious markets for perishable commodities, or even turn out an omnibus that can be mounted without an effort of agility and daring.

Mr. Giblett, the noted butcher, late of Bond Street, calculates that the amount of meat brought by the railways into Newgate is three times that supplied by the London carcase butchers, who annually send 52,000 oxen, 156,000 sheep, 10,400 calves, and 10,400 pigs. Taking this estimate, and applying it also to the Leadenhall market, we shall have at

	Beasts.	*Sheep.*	*Calves.*	*Pigs.*
Newgate, meat . . .	156,000	468,000	31,200	31,200
Leadenhall, ditto . . .	5,200	41,600	..	..
	161,200	509,600	31,200	31,200
Live stock brought to London .	322,188	1,630,793	101,776	127,852
Total supply of live stock and meat to London . .	483,388	2,140,393	132,976	159,052

This we are convinced is still below the truth, for we have not

included the country-killed meat sold at Farringdon and Whitechapel markets.* The total value of this enormous supply of flesh cannot be much less than fourteen millions annually.

These figures demonstrate that the falling off of sheep sent to London is solely because they now come to town in the form of mutton. It is sent to a much greater extent than beef, in consequence of its arriving in finer condition, being more easily carried, and better worth the cost of conveyance on account of the larger proportion of prime joints. Indeed, the entire carcase of the oxen never comes, since the coarse boiling-pieces would have to pay the same carriage as the picked "roastings." Newgate, be it remembered, is eminently a West End market, and fully two-thirds of its meat find its way to that quarter of the town. Accordingly, most of the beef "pitched" here consists of sirloins and ribs; and, in addition to whole carcases of sheep, there are numerous separate legs and saddles of mutton. This accounts for a fact that has puzzled many, namely, how London manages to get such myriads of chops. Go into any part of the metropolis, and look into the windows of the thousand eating-houses and coffee-shops in the great thoroughfares, and in every one of them there is the invariable blue dish with half a dozen juicy, well-trimmed chops, crowned with a sprig of parsley. To justify such a number, either fourfold the supply of sheep must come to London that we have any account of, or in lieu of the ordinary number of vertebræ they must possess as many as the great boa. When the prodigious store of saddles which the country spares the town have once been seen the wonder ceases. "Sometimes I cut 100 saddles into mutton-chops to supply the eating-houses," says Mr. Banister, of Threadneedle Street.

The weather preserves a most delicate balance between

* There is, we confess, some little discrepancy between this estimate of the country-killed meat at Newgate, and the known quantity brought in by railway, as most assuredly 161,200 oxen, 509,600 sheep, and 62,400 calves and pigs, far outweigh the 36,487 tons of meat brought by the different lines, even "sinking" the offal. But so assured is Mr. Giblett, and the Smithfield Commissioners with him, that he is under the mark, that we give credit to his estimate, and take it for granted that much country-killed meat must come to market by other conveyance than the railway.

Newgate and Smithfield. Winter is the busy time at the former market, when meat can be carried any distance without fear of taint. As soon as summer sets in, Smithfield takes its turn; for butchers then prefer to purchase live stock, in order that they may kill them the exact moment they are required. Sometimes as many as 1,200 beasts and from 12,000 to 15,000 sheep are slaughtered in hot weather on a Friday night, in the neighbourhood of Smithfield, for Saturday's market. Every precaution is taken on the railways to keep the meat sweet. The Eastern Counties Company provide "peds," or cloths cut to the shape of the carcase or joint, for the use of their customers, and sometimes it is conveyed from the north in boxes. When, in spite of care, it turns out to be tainted, the salesman to whom it is consigned calls the officer of the market, by whom it is forthwith sent to Cow Cross, and there burnt in the nacker's yard. According, however, to a competent witness—Mr. Harper—bad meat in any quantity can be disposed of in the metropolis to butchers living in low neighbourhoods, who impose it upon the poor at night. "There is one shop, I believe," he says, "doing 500*l.* per week in diseased meat. This firm has a large foreign trade. The trade in diseased meat is very alarming, and anything in the shape of flesh can be sold at about 1*d.* per pound or 8*d.* per stone."

If the reader is not already surfeited with the mountains of meat we have piled before his eyes, let us beg his attention for a few minutes to game and poultry, which we bring on in their proper course. Leadenhall and Newgate, as all the world knows, are the great metropolitan depôts for this class of food, especially the former, which receives perhaps two-thirds of the entire supply. The quantities of game and wild birds consigned to some of the large salesmen almost exceeds belief. After a few successful battues in the Highlands, it is not at all unusual for one firm to receive 5,000 head of game, and as many as 20,000 to 30,000 larks are often sent up to market together. All other kinds of the feathered tribe which are reputed good for food are received in proportionate abundance. If it were not for the great salesmen, many a merry dinner would be

marred, for the retail poulterers would be totally incapable of executing the constant and sudden orders for the banquets which are always proceeding. The good people at the Crystal Palace have already learned to consume, besides unnumbered other items, 600 chickens daily; and from this we may guess how vast the wants of the entire metropolis. The sources from which game and poultry are derived are fewer than might be imagined. The Highlands and Yorkshire send up nearly all the grouse; and scores of noblemen, members of Parliament, and other wealthy or enthusiastic sportsmen, who are at this present moment beating over the moors, and walking for their pleasure twenty-five miles a day, assist to furnish this delicacy to the London public at a moderate rate.

Pheasants and partridges mainly come from Norfolk and Suffolk; snipes from the marshy lowlands of Holland, which also provides our entire supply of teal, widgeon, and other kinds of wild fowl, with the exception of those caught in the "decoys" of Cambridgeshire and Lincolnshire. From Ostend there are annually transmitted to London 600,000 tame rabbits, which are reared for the purpose on the neighbouring sand dunes. We are indebted to Ireland for flocks of plovers, and quails are brought from Egypt and the south of Europe. In most of our poulterers' windows may be seen the long wooden boxes, with a narrow slit, in which these latter birds are kept until required for the spit. Not long since upwards of 17,000 came to London *vid* Liverpool, whither they had been brought from the Campagna, near Rome. Of the 2,000,000 of fowls that every year find a resting-place *vis-à-vis* to boiled tongues on our London tables, by far the greatest quantity are drawn from the counties of Surrey and Sussex, where the Dorking breed is in favour. Ireland also sends much poultry. No less than 1,400 tons of chickens, geese, and ducks are brought to town annually by the Great Western Railway, most of which are from the neighbourhood of Cork and Waterford, whence they are shipped to Bristol. Londoners are accustomed to see shops of late years which profess to sell "West of England produce," such as young pork, poultry, butter, and clouted cream. All these delicacies are

brought by the Great Western Railway, and are principally the contributions of Somersetshire and Devonshire. The bulk of the geese, ducks, and turkeys, however, come from Norfolk, Cambridge, Essex, and Suffolk—four fat counties, which do much to supply the London commissariat, the Eastern Counties Railway alone having brought thence last year 22,462 tons of fish, flesh, fowl, and good red herrings.

For pigeons we are indebted to "our fair enemy France," as Sir Philip Sydney calls her, but now we trust our fast friend. They proceed principally from the interior, and are shipped for our market from Boulogne and Calais. How many eggs we get from across the Channel we scarcely like to say. Mr. M'Culloch considers that the capital receives from 70,000,000 to 75,000,000—a number which we think must be much below the mark, seeing that the Brighton and South Coast line brings annually 2,600 tons, the produce of Belgium and France. At Bastoign, in the latter country, there is a farm of 200 acres entirely devoted to the rearing of poultry and the production of eggs for the supply of London.

No perfectly accurate account can be given of the number per annum of poultry, game, and wild birds which enter Leadenhall and Newgate markets; but the following estimate was handed to us by a dealer who turns over 100,000*l.* a year in this trade. As the list takes no account of the quantity which goes direct to the retailer, nor of the thousands sent as presents, it must fall short of the actual consumption :—

Grouse	100,000
Partridges	125,000
Pheasants	70,000
Snipes	80,000
Wild Birds (mostly small)	150,000
Plovers	150,000
Quails	30,000
Larks	400,000
Widgeon	70,000
Teal	30,000
Wild Ducks	200,000
Pigeons	400,000
Domestic Fowls	2,000,000
Carried forward	3,805,000

Brought forward . . .	3,805,000
Geese	100,000
Ducks	350,000
Turkeys	104,000
Hares	100,000
Rabbits	1,300,000
TOTAL . .	5,759,000

In addition to its dead game and wild fowl, Leadenhall market is quite a Noah's ark of live animals. Geese, ducks, swans, pigeons, and cocks, bewilder you with their noise. Intermingled with these birds of a feather are hawks, ferrets, dogs and cats, moving about in their wicker cages, and almost aggravated to madness by the proximity of their prey. The major portion of the live stock is designed either for sporting purposes or for "petting" and breeding, and do not belong to the commissariat department. Of the dead game and poultry, the seven railways bring to London about 7,871 tons weight in the course of the year.

In taking leave of the poultry-yard we are reminded of the dairy, and of the large establishments required to fill the milk-jugs of London. There are at the present moment, as near as we can learn, 20,000 cows in the metropolitan and suburban dairies, some of which number 500 cows apiece. Even these gigantic establishments have been occasionally exceeded, and one individual, several years ago, possessed 1,500 milkers—a fact fatal to the popular superstition, that notwithstanding many attempts, no dairyman could ever muster more than 999. The terrible ravages of pleuro-pneumonia, which many believe to be a contagious disease, have cured the passion for such extensive herds. The larger dairies of the metropolis are on the whole admirably managed, and the cows luxuriate in airy outhouses, but the smaller owners are often confined for space, and the animals are sometimes cooped in sheds, placed in tiers one above another. The country dairymaid laughs at the ignorance which the Londoner betrays of rural matters when on a visit to her master, but she would be perplexed in her turn if told that in the capital they fed the cows chiefly upon brewers' grains, and milked them on the *second story?* A few

years since Mr. Rugg appalled the town, which had forgotten Matthew Bramble, Esq., and the "New Bath Guide," by detailing a nauseous process which he affirmed was in use among cunning milkmen for the adulteration of their milk. There was, however, a great deal of exaggeration in the account, and Dr. Hassell, whose analysis of various articles of food in the *Lancet* are widely known, states that the "iron-tailed cow" is the main agent employed in the fraud, and that the only colouring matter he has been enabled to discover is annatto. Nearly all the cream goes to the West-End; and one dairyman living at Islington informed us that he made 1,200*l.* a year by the trade he carried on in that single article with the fashionable part of the town. It must be evident, upon the least consideration, that the London and suburban dairies alone could not supply the metropolis. If each of the 20,000 cows give on the average twelve quarts a day, the sum total would only be 240,000 quarts. If we suppose this quantity to be increased by the exhaustless "iron-tailed cow," of which Dr. Hassell speaks, to 300,000 quarts, the allowance to each individual of the two millions and a quarter of population would be little more than a quarter of a pint. This is clearly below the exigencies of the tea-table, the nursery, and the kitchen, and we do not think we shall make an over-estimate if we assume that half as much again is daily consumed. Here again the railway, which in some cases brings milk from as far as eighty miles, makes up the deficiency. The Eastern Counties line conveyed in 1853 to London, 3,174,179 quarts, the North-Western 144,000 quarts, the Great Western 23,400 quarts, the Brighton and South Coast 100 tons, and the Great Northern as much perhaps as the North-Western. The milk is collected from the farmers by agents in the country, who sell it to the milkmen, of whom there are 1,347, to distribute it over the town. In course of time it is possible that town dairies may entirely disappear. Cowsheds, often narrow and low, in thickly-populated localities, cannot be as healthy for the animals as a purer atmosphere; and though experiment has shown that they thrive admirably

when stalled, the food they get in these urban prisons can hardly be as wholesome as that provided by the verdant pastures of the farm. The milk which comes by railway has, however, this disadvantage, that it will not keep nearly so long as the indigenous produce of the metropolitan dairies. The different companies have constructed waggons lightly hung on springs, but the churning effect of sudden joltings cannot be altogether got rid of.

Of the vegetables and fruit that are brought into the various markets of the capital, but especially to Covent Garden, a very large quantity is grown in the immediate neighbourhood. From whatever quarter the railway traveller approaches London, he perceives that the cultivation of the land gradually heightens, until he arrives at those suburban residences which form the advanced guards of the metropolis. The fields give place to hedgeless gardens, in which, to use a phrase of Washington Irving, "the furrows seem finished rather with the pencil than the plough." Acre after acre flashes with hand-glasses, streaks of verdure are ruled in close parallel lines across the soil with mathematical precision, interspersed here and there with patches as sharp cut at the edges as though they were pieces of green baize—these are the far-famed market-gardens. They are principally situated in the long level tracts of land that must once have been overflowed by the Thames—such as the flat alluvial soil known as the Jerusalem Level, extending between London Bridge and Greenwich—and the grounds about Fulham, Battersea, Chelsea, Putney, and Brentford. Mr. Cuthill, who is perhaps the best authority on this subject, estimates that there are 12,000 acres under cultivation for the supply of vegetables and 5,000 for fruit-trees. This seems an insufficient area for the supply of so many mouths, but manure and active spade husbandry compensate for lack of space. By these agencies four and sometimes five crops are extracted from the land in the course of the year. The old-fashioned farmer, accustomed to the restrictions of old-fashioned leases, would stare at such a statement, and ask how long it would last. But his surprise would be

still greater at being told that after every clearance the ground is deeply trenched, and its powers restored with a load of manure to every thirty square feet of ground. This is the secret of the splendid return, and it could be effected nowhere but in the neighbourhood of such cities as London, where the produce of the fertilizer is sufficiently great to keep down its price. And here we have a striking example of town and country reciprocation. The same waggon that in the morning brings a load of cabbages, is seen returning a few hours later filled with dung. An exact balance as far as it goes is thus kept up, and the manure, instead of remaining to fester among human beings, is carted away to make vegetables. What a pity we cannot extend the system, and turn the whole sewerage by drain-pipes entirely into the rural districts, to feed the land, instead of allowing it, as we do, to run into the Thames and pollute the water to be used in our dwellings.

The care and attention bestowed by the market-gardeners is incredible to those who have not witnessed it; every inch of ground is taken advantage of—cultivation runs between the fruit-trees; storming-parties of cabbages and cauliflowers swarm up to the very trunks of apple-trees; raspberry-bushes are surrounded and cut off by young seedlings. If you see an acre of celery growing in ridges, be sure that, on a narrow inspection, you will find long files of young peas picking their way along the furrows. Everything flourishes here except weeds, and you may go over a 150-acre piece of ground without discovering a single one. Quality, even more than quantity, is attended to by the best growers; and they nurse their plants as they would children. The visitor will sometimes see "the heads" of an acre of cauliflowers one by one folded up in their own leaves as carefully as an anxious wife wraps up an asthmatic husband on a November night; and if rain should fall, attendants run to cover them up, as quickly as they cover up the zoological specimens at the Crystal Palace when the watering-pots are set to work

Insects and blight are also banished as strictly as from the court of Oberon. To such a pitch is vigilance carried, that,

according to a writer in *Household Words*, blight and fungi are searched after with a microscope, woodlice exterminated by bantems dressed in socks to prevent too much scratching, and other destructive insects despatched by the aid of batches of toads, purchased at the rate of six shillings a dozen!

The continual extension of London is, however, rapidly encroaching upon all the old market-gardens, and they are obliged to move farther a-field: thus high cultivation, like a green fairy-ring, is gradually widening and enlarging its circle round the metropolis. The coarser kinds of vegetables are but sparingly grown in these valuable grounds, but come up in large quantities from all parts of the country; and some of the choice kinds are now reared far away in Devonshire and Cornwall, where they are favoured by the climate. It would be interesting to get an authentic statement of the acreage dedicated to fruit and vegetables for the London market, but we find the information unattainable. Mr. Cuthill calculates that there are 200 acres employed around the metropolis in the growth of strawberries, and 5 acres planted as mushroom-beds. Cucumbers were once very largely cultivated. He has seen as many as 14 acres under hand-glasses in a single domain, and has known 200,000 gherkins cut in a morning for the pickle-merchants. Strangely enough, they have refused to grow well around London ever since the outbreak of the potato disease. The disastrous epidemic of 1849, we have little doubt, had much to do with the diminished supply, for the cholera soon brought about the result desired by Mrs. Gamp, "when cowcumbers is three for twopence," prices quite explanatory of the indisposition of the land to produce them. The very high state of cultivation in the metropolitan market-gardens necessitates the employment of a large amount of labour; and it is supposed that no less than 35,000 persons are engaged in the service of filling the vegetable and dessert-dishes of the metropolis. This estimate leaves out those in the provinces and on the Continent, which would, we doubt not, nearly double the calculation, and show a troop of men and women as large as the entire British army. There are five marts in London

devoted to the sale of fruit—Covent Garden, Spitalfields, the Borough, Farringdon, and Portman-markets,—besides a vast number of street offsets, such as Claré-market, in which hawkers generally stand with their barrows. Covent Garden is not only their type, but it does nearly as much business as all of them put together, and for that reason we shall dwell upon it to the exclusion of the others.

At the first dawn of morning in the midst of squalid London, sweet country odours greet the early-riser, and cool orchards and green strawberry slopes seem ever present to the mind.

If those who seek pleasure in gaiety have never visited the market in its prime, let them journey thither some summer morning, and note how fresh will seem the air, and how full of life the people, after the languid waltz in Grosvenor Square. The central alley of the "Garden," as it is called by the costermongers, is one of the prettiest lounges in town; and, whether by chance or design, it exhibits, in its arrangement from east to west, a complete march of the seasons. At the western entrance the visitor is greeted with the breath of flowers; and there they show in smiling banks piled upon the stalls, or sorted with frilled edges into ladies' bouquets. As he proceeds, he comes upon the more delicate spring vegetables—pink shafts of the oriental-looking rhubarb, delicate cos lettuce, &c.; still further along the arcade, the plate-glass windows on either side display delicate fruits, done up in dainty boxes, and set off with tinted paper shreds. Behind these windows also might be seen those rarities which it is the pride of London market-gardeners to provide, and in producing which they all struggle to steal the longest march upon time—a sieve-full of early potatoes, each as small and costly as the egg of a Cochin-China fowl—a basin-full of peas, at a guinea a pint—a cucumber marked *5s.*, and strawberries 18*s.* the ounce.

The market-gardeners of Penzance are beginning to send up many of these early vegetables, the mildness of the south-western extremity of Cornwall giving them a wonderful advantage over every other part of the kingdom. Gentlemen's gardeners also contribute somewhat, by sending to the salesmen such of the

produce of their glazed houses as is not consumed in the family, and receive articles in return of which they happen to have an insufficient quantity themselves. These forced vegetables give way, it is true, as the season advances; but when in, they are always most to be found at that end of the walk nearest the rising sun. As the year proceeds, the lustier and more natural fruits are displayed—peaches that have ripened with blushing cheek to the wind, gigantic strawberries, raspberries, nectarines, or blooming plums. Feathery pines add their mellow hue; and when these fail, the colour deepens into amber piles of oranges, umber filberts, and the rich brown of Spanish chestnuts, the produce of the waning year.

To leave, however, our fancied procession of the seasons, and to return to the actual business of the market. As early as two o'clock in the morning, a person looking down the dip of Piccadilly will perceive the first influx of the daily supply of vegetables and fruit to Covent Garden market: waggons of cabbages, built up and regularly faced, with the art rather of the mason than the market-gardener; light spring-vans fragrant with strawberries; and milk-white loads of turnips which slowly roll along the great-western road, and bring the produce of the fertile alluvial shores of the Thames to the great west-end mart. The pedestrian proceeding along the southern and eastern roads sees the like stream of vegetable food quietly converging to the same spot. From this hour, especially upon a Saturday morning, until nine o'clock, the scene at the market itself is of the most exciting description.

Without some organization it would be impossible to receive and display to the advantage of the buyer and seller the varied products that in the grey of the morning pours into so limited a space. Accordingly, different portions of it are dedicated to distinct classes of vegetables and fruits. The finest of the delicate soft fruit, such as strawberries, peaches, &c., are lodged, as we have mentioned, in the central alley of the market—the inmost leaf of the rose. On the large covered space to the north of this central alley is the wholesale fruit-station, fragrant with apples, pears, greengages, or whatever is in season. The

southern open space is dedicated to cabbages and other vegetables; and the extreme south front is wholly occupied by potato-salesmen. Around the whole quadrangle, during a busy morning, there is a party-coloured fringe of waggons backed in towards the central space, in which the light green of cabbages forms the prevailing colour, interrupted here and there with the white of turnips, or the deep orange of digit-like carrots; and as the spectator watches, the whole mass is gradually absorbed into the centre of the market. Meanwhile the space dedicated to wholesale fruit sales is all alive. Columns of empty baskets twelve feet high seem progressing through the crowd "of their own motion." The vans have arrived from the railways, and rural England, side by side with the Continent, pours in its supplies from many a sheltered mossy nook. It is very easy to discover by a glance which are the home-grown, which the foreign contributions. There stand the English baskets and sieves, solid and stout as Harry the Eighth, amidst little hampers, as delicate as French ladies, and seemingly as incapable of withstanding hard usage. Yet some of these have come from Algiers, others from the south of France with greengages, and the majority from Normandy. France is beginning to send large quantities of peaches and nectarines, carefully packed with paper-shavings in small boxes; and even strawberries this summer have found their way here from the same quarter. The frosts which sometimes occur in the early part of the year, destroy nearly all the fruit-crops in the neighbourhood of London; and were it not for the bountiful stores which are brought from abroad, Covent Garden would be little better than a desert.

The repeal of the high duty upon foreign fruit has so far widened the field of supply that it can no longer be destroyed by an unusual fall of the mercury. By means of the telegraph, the steamboat, and the railroad, we annul the effects of frost, obliterate the sea, and command, at a few hours' notice, the produce of the Continent. When there is a dearth in this country the fact is immediately noticed by the great fruit-dealers in the City: the telegraph forthwith conveys the in-

formation to Holland, France, and Belgium ; and within forty hours steamers from one or other of these countries will be seen making towards the Downs and adjoining coasts, and in another six their cargoes, fresh plucked from the neighbourhoods of old Norman abbeys and quaint Flemish stadthouses, are blooming in Covent Garden. Fruit that will bear delay comes up the Thames by boat, and is discharged at the wharfs near London Bridge, but the major part eventually finds its way to the "Garden." The South-Western and South-Eastern are the two principal lines for foreign fruit : the former brings large quantities of Spanish and Portuguese produce—such as oranges, grapes, melons, nuts, &c.; the latter conveys apples, pears, strawberries, peaches, nectarines, &c., from Dover, to which place they are brought by steamers. To show how enormous is the supply from abroad, we give, on the authority of the goods-manager of the South-Eastern line, the amount brought by them in one night :—

100 tons of green peas from France.
50 ,, of fruit from Kent.
10 ,, of filberts from Kent.
25 ,, of plums from France.
10 ,, of black currants from France.

In all 195 tons ; out of which 135 were from across the water. The Brighton and South Coast transmit the produce of Jersey and Dieppe—apples, pears, and plums—to the extent last year of about 300 tons. Of vegetables the Great Northern is the principal carrier ; last year they brought to town the enormous quantity of 45,819 tons of potatoes, besides 1,940 tons of other vegetables. The potatoes mainly proceed from the fen country. Walnuts generally come by the Antwerp boats, which sometimes carry cargoes of between 400 and 500 tons. Everybody who has travelled in the Low Countries remembers the magnificent walnut-trees which grow along the sides of the canals as commonly as elms in our own country. These eke out our scantier native stores, and help to make cosier the after-dinner chat over the glass of port. During two mornings that we visited Covent Garden we saw 613 bushel-baskets of straw-

berries that had just come from Honfleur, and upwards of 1,000 baskets of greengages arrived from the same neighbourhood during the week. As we gazed, on one of these occasions, upon the solid walls of baskets extending down the market, crowned with parapets of peach and nectarine boxes, we wondered in our own minds whether it would ever be all sold, and the wonder increased as waggon after waggon arrived, piled up as high as the second-floor windows of the piazza. Venturing to express this doubt to a lazy-looking man who was plaiting the strands of a whip, "Blessee, sir," he replied without looking up from his work, "the main part on 'em will be at Brummagem by dinner-time." True enough, while we had been guessing and wondering, a nimble fellow had run to the telegraph and inquired of Birmingham and a few distant towns whether they were in want of certain fruits that morning. The answer being in the affirmative, the vans turned round, rattled off to the North-Western station, and in another hour the superfluity of Covent Garden was rushing on its way to fill up the deficiency of the midland counties. Thus the wire and steam, both at home and abroad, cause the supply to respond instantly to the demand, however wide apart the two principles may be working.

The strawberry trade of Covent Garden is not likely, however, at present to fall into the hands of foreigners. The London market-gardeners have long looked with justice upon this fruit as particularly their own. By the skill they have bestowed upon its culture it has advanced enormously, both in flavour and size, from the old standard "hautboy" of our fathers, and which foreigners mainly cultivate to the present day. Mr. Miatt, of Deptford, is the great grower; by judicious grafting he has produced from the old stock half-a-dozen different kinds, the most celebrated being the "British Queen," which attains a prodigious size. Large quantities of strawberries are sent to the market in light spring-vans. They are placed in 1 lb. punnets or round willow baskets, or they are carefully piled in pottles, and the process of "topping-up," as it is called, is considered quite an art in the trade. The rarest

and ripest fruit, which goes direct to the pastrycooks, is still more deftly treated. Lest it should be injured by jolting, horse is exchanged for human carriage. A procession of eight or ten stout women, carrying baskets full of strawberry-pottles upon their heads, may often be seen streaming in hot haste up Piccadilly, preceded by a man, like so many sheep by a bell-wether. It is probable that they have trudged all the way from Isleworth with the fruit, and, as they frequently make two journeys in the day, the distance traversed is not less than twenty-six miles.

After strawberries, perhaps peas are the most important article produced by the market-gardeners. Dealers, in order to consult the convenience of hotel-keepers and such as require suddenly a large supply for the table, keep them ready for the saucepan; and not the least curious feature of Covent Garden, about midday, is to see a dense mass of women—generally old—seated in rows at the corner of the market, engaged in shelling them. One salesman often employs as many as 400 persons in this occupation. The major part of these auxiliaries belong to the poor-houses around; they obtain permission to go out for this purpose, and the shilling or eighteen pence a-day earned by some of the more expert is gladly exchanged for the monotonous rations of the parish. In the autumn, again, there will be a row of poor creatures, extending along the whole north side of the square, shelling walnuts, each person having two baskets, one for the nuts, another for the shells, which are bought by the catsup-makers. The poor flock from all parts of the town directly a job of the kind is to be had. If a fog happens in November, thousands of link-boys and men spring up with ready-made torches; if a frost occurs, hundreds of men are to be found on the Serpentine and other park waters, to sweep the ice or to put on your skates: there are, in the busy part of the town half-a-dozen fellows ready of a wet day to rush simultaneously to call a cab "for your honour;" and every crossing when it grows muddy almost instantly has its man and broom. A sad comment this upon the large floating population of starving labour always to be found in the streets of London.

The busiest time at the market is about six o'clock, when the costermongers surround Covent Garden with their barrows, and hundreds of street hawkers, with their hand-baskets and trays, come for their day's supply. The same system of purchase is pursued here as at Billingsgate—the rich dealers buy largely and sell again, and the poorer club their means and divide the produce. The regular street vender who keeps his barrow, drawn by a donkey or a pony, looks down with a certain contempt upon the inferior hawkers, principally Irish. They only deal in a certain class of vegetables, such as peas, young potatoes, broccoli, or cauliflowers, and have nothing to do with *mere greens*. Another class of purchasers are the little girls who vend watercresses. Such is the demand for cresses, that they are now largely cultivated for the market, the spontaneous growth proving quite inadequate to the demand. They are produced principally at "Spring Head," at Walthamstow, in Essex, and at Cookham, Shrivenham, and Faringdon, on the line of the Great Western, which brings to town no less than a ton a week of this wholesome breakfast salad. The best, however, come from Camden Town. Most people fancy that clear purling streams are necessary for their production; but the Camden Town beds are planted in an old brick-field, watered by the Fleet Ditch; and though the stream at this point is comparatively pure, they owe their unusually luxuriant appearance to a certain admixture of the sewerage. A great many hundreds of bunches are sold every morning in Covent Garden; but the largest share goes to Farringdon Market. The entire supply to the various metropolitan markets cannot be less than three tons weekly. Rhubarb is almost wholly furnished by the London market-gardeners. It was first introduced by Mr. Miatt forty years ago, who sent his two sons to the Borough Market with five bunches, of which they only sold three. From this time he continued its cultivation, notwithstanding the sneers at what were called his "physic pies." As he predicted, it soon became a favourite, and now hundreds of tons weight are sold in Covent Garden in the course of the year. It would be impossible to give any precise account of the fruit and vegetable produce that is poured day by day into London; for the autho-

rities themselves only know how many baskets arrive, not how much they contain. The railway returns give us the quantity brought from a distance, and we find that the seven lines transmit annually somewhere about 70,000 tons of vegetables and soft green fruit. This is irrespective of dried fruit, oranges, &c.—a business of itself, involving great interests, and employing an immense capital, and of which we will say a few words.

The foreign-fruit trade has its head-quarters in the city. The pedestrian who walks down Fish Street Hill would assuredly never surmise that at certain seasons a regular fruit exhibition is kept up within those dull brick houses, before which the tall column lifts its head. All the world knows the Messrs. Keeling and Hunt, whose effigies seem to stand, in the public eye, upon a vast pyramid of pine-apples. This firm hold sales of various kinds of fruit in their auction-rooms in Monument Yard. On these occasions the long apartments make a show, before which, for quantity at least, that of Chiswick pales. Pine-apples by thousands, melons, forbidden fruit, and mangoes, fill the room from end to end; so famous indeed is the display, that there are lithographic engravings of it, in which the salesmen are seen walking about as perplexed, apparently by the luscious luxuriance around them, as Adam might have been in his own happy garden. The pine-apple market is of modern date. The first cargo was brought over about twenty years ago, and since that time the traffic has rapidly increased, and at the present moment 300,000 pines come yearly into the port of London, of which nine-tenths are consigned to Messrs. Keeling and Hunt, the original importers. They are principally from the Bahamas, in the West Indies, where they grow almost spontaneously; but of late years they have been more carefully cultivated, and grafts of our best hothouse pines have been taken out to improve their quality. There is a fleet of clippers appropriated to the carriage across the sea of this single fruit. The melons come from Spain, Portugal, and Holland. Spain is known to abound in melons, for Murillo's beggar-boys are perpetually eating them; but we believe it will be news to most Englishmen that the land of dykes supplies London with fragrant cargoes of an almost tropical fruit. The largest foreign-fruit

trade, however, by far, is that in oranges. We shall perhaps astonish our readers when we tell them that upwards of 60,000,000 are imported for the use of London alone, accompanied by not less than 15,000,000 lemons. Any time between December and May the orange clippers from the Azores and Lisbon may be seen unloading their cargoes in the neighbourhood of the great stores in Pudding and Botolph Lanes. There are 240 of these fast-sailing vessels engaged in the entire trade, and of this fleet seventy at least are employed in supplying the windows of the fruiterers and the apple-stalls of London. All these fruits, together with nuts and walnuts, apples, plums, pears, and some peaches, &c., are disposed of weekly at the auction sales in Monument Yard to the general dealers, the majority of whom are located in Duke's Place, close at hand, and are mostly Jews. Indeed we are informed that many of them are the identical boys grown up to manhood that used some twenty-five years ago to sell oranges about the streets, and whose old place has gradually been taken by the Irish. They act as middlemen between the importers and the tribe of peripatetics who, at certain times of the day, resort hither to fill their baskets and barrows. Covent Garden also supplies retailers with oranges and nuts, especially on Sunday mornings, when the place is sometimes crowded like a fair. The following bill of quantities, drawn up by Mr. Keeling, is derived, we believe, from the Custom House returns :—

Fruit.

Apples	39,561 bushels.
Pears	19,742 ,,
Cherries	264,240 lbs.
Grapes	1,328,190 ,,
Pine-apples	200,000
Oranges	61,635,146
Lemons	15,408,789

Nuts.

Spanish nuts Barcelona	72,509 bushels
Brazil	11,700 ,,
Chestnuts	26,250 ,,
Walnuts	36,088 ,,
Cocoa-nuts	1,255,009

Of the amount of bread consumed in London we have no specific information, but there are data which enable us to approximate to the truth. Porter, in his "Progress of the Nation," gives us the returns of eight schools, families, and institutions, containing 1,902 men, women, and children, each of whom ate on the average 331$\frac{1}{16}$ lbs. of bread per annum. Now if we multiply this quantity by the number of the inhabitants of the metropolis—2,500,000, or thereabouts—we have a total of 413,760,000 half-quartern loaves of 2 lbs. weight each. The flour used in puddings, pies, &c., we throw in as a kind of offset against the London babies under one year old. Some of this bread is a contribution from the country, and one Railway —the Eastern Counties—brought last year 237 tons 12 cwts. to town.

Now let us see how much sack goes to all this quantity of bread—with what rivers of stout, &c., we wash down such mountains of flesh. According to the excise returns, there were 747,050 quarters of malt consumed in London in the year 1853 by the seventeen great brewers. As each quarter of malt, with its proportionate allowance of hops, produces three and a half barrels of beer, we get at the total brew of last year 1,614,675, or pretty nearly a thousand million tumblers of ale and porter. On countless sign-boards of the metropolis this last is advertised by the title of "entire," and it is thus that the liquid and its name arose. Prior to the year 1730, publicans were in the habit of selling ale, beer, and twopenny, and the "thirsty souls" of that day were accustomed to combine either of these in a drink called half-and-half. From this they proceeded to spin "three threads," as they called it, or to have their glass filled from each of the three taps. In the year 1730, however, a certain publican, named Horwood, to save himself the trouble of making the triune mixture, brewed a liquor intended to imitate the taste of the "three threads," and to this he applied the term "entire." His concoction was approved, and, being puffed as good porters' drink, it speedily came to be called porter itself. Of the seventeen great London breweries, the house of Truman, Hanbury, Buxton, and Co.

stood in 1853 at the top of the list, having consumed 140,000 quarters of malt, and paid to the excise 180,000*l.*, or enough to build two ninety-gun ships, at the usual cost of a thousand pounds per gun. The visitor in proceeding through this establishment realizes, perhaps better than in any other place, the enormous scale on which certain creature-comforts for the use of the town are produced. As he walks between the huge boilers in which 1,600 barrels are brewed nearly every day, or makes the circuit of the four great vats, each containing 80,000 gallons of liquor, or loses himself amid the labyrinth of 135 enormous reservoirs, which altogether hold 3,500,000 gallons —he begins to fancy himself an inhabitant of Lilliput, who has gone astray in a Brobdignagian cellar. There is a popular notion that the far-famed London stout owes its flavour to the Thames water: this, however, is a "vulgar error." Not even the Messrs. Barclay, who are upon the stream, draw any of their supply from that source, but it is got entirely from wells, and those sunk so deep, that they and the Messrs. Calvert, whose brewery is half a mile distant upon the opposite side of the river, find they are rivals for the same spring. When one brewery pumps, it drains the wells of the other, and the firms are obliged to obtain their water on alternate days. Whether it is owing to the increase of the great breweries and of other manufactories, which alone consume millions of barrels of water yearly, we know not, but it is an ascertained fact, that the depth of water in the London wells has for the last twenty-five years been diminishing at the rate of a foot a year. "It is comforting to reflect," said one of the great brewers, "that the reason simply is, because the water which used to be buried underground is now brought up to fill the bodies, wash the faces, and turn the wheels of two millions and a half of people."

If the underground stock of water is shrinking, it has increased vastly on the surface. The seven companies which supply the metropolis bring in between them 44,000,000 gallons daily—a quantity which, large as it is, could be delivered in twenty-four hours by a brook nine feet wide and three feet

deep, running at the rate of three feet per second, or a little more than two miles per hour.

The inability of figures to convey an adequate impression to the mind of the series of units of which the sums are composed renders it impossible to give more than a faint idea of the enormous supplies of food required to victual the capital for a single year. But the conception may be somewhat assisted by varying the process. Country papers now and then astonish their readers by calculations to show how many times the steel pens manufactured in England would form a necklace round their own little town, or how many thousand miles the matches of their local factory would extend if laid in a straight line from the centre of their market-place. Let us try our hand on the same sort of picture, and endeavour to fill the eye with a prospect that would satisfy the appetite of the far-famed Dragon of Wantley himself.

If we fix upon Hyde Park as our exhibition-ground, and pile together all the barrels of beer consumed in London, they would form a thousand columns not far short of a mile in perpendicular height.

Let us imagine ourselves on the top of this tower, and we shall have a look-out worthy of the feast we are about to summon to our feet. Herefrom we might discover the Great Northern road stretching far away into the length and breadth of the land. Lo! as we look, a mighty herd of oxen, with loud bellowing, are beheld approaching from the north. For miles and miles the mass of horns is conspicuous winding along the road, ten abreast, and even thus the last animal of the herd would be 72 miles away, and the drover goading his shrinking flank considerably beyond Peterborough. On the other side of the park, as the clouds of dust clear away, we see the great Western road, as far as the eye can reach, thronged with a bleating mass of wool, and the shepherd at the end of the flock (ten abreast) and the dog that is worrying the last sheep are just leaving the environs of Bristol, 121 miles from our beer-built pillar. Along Piccadily, Regent-street, the

Strand, Fleet-street, Cheapside, and the eastward Mile-end-road line, for 7½ miles, street and causeway are thronged with calves, still ten abreast; and in the great parallel thoroughfares of Bayswater-road, Oxford-street, and Holborn, we see nothing for nine long miles but a slowly-pacing, deeply-grunting herd of swine. As we watch this moving mass approaching from all points of the horizon, the air suddenly becomes dark—a black pall seems drawn over the sky—it is the great flock of birds—game, poultry, and wild-fowl, that, like Mrs. Bond's ducks, are come up to be killed: as they fly wing to wing and tail to beak they form a square whose superficies is not much less than the whole enclosed portion of St. James's Park, or 51 acres. No sooner does this huge flight clear away than we behold the park at our feet inundated with hares and rabbits.

Feeding 2,000 abreast, they extend from the marble arch to the round pond in Kensington Gardens—at least a mile. Let us now pile up all the half-quartern loaves consumed in the metropolis in the year, and we shall find they form a pyramid which measures 200 square feet at its base, and extends into the air a height of 1,293 feet, or nearly three times that of St. Paul's. Turning now towards the sound of rushing waters, we find that the seven companies are filling the mains for the day. If they were allowed to flow into the area of the adjacent St. James's Park, they would in the course of the 24 hours flood its entire space with a depth of 30 inches of water, and the whole annual supply would be quite sufficient to submerge the city (one mile square) ninety feet. Of the fish we confess we are able to say nothing: when numbers mount to billions, the calculations become too trying to our patience. We have little doubt, however, that they would be quite sufficient to make the Serpentine one solid mass. Of ham and bacon again, preserved meats, and all the countless comestibles we have taken no account, and in truth they are little more to the great mass than the ducks and geese were to Sancho Panza's celebrated mess—"the skimmings of the pot."

Such, then, is a slight sketch of the great London larder.

It may be imagined that many of these stores come to the metropolis only as to a centre for redistribution, and are again scattered over the length and breadth of the land. This, however, is not the case. The only line that takes food in any quantities out of London is the North-Western. This railway speeds into the midland counties, but especially to Birmingham, 350 tons of fish consigned to the country dealers, and to the nobility and gentry. As we have before seen, van-loads of fruit are often despatched in the same direction. The South-Eastern conveys large quantities of grain down the line, and the London and Brighton and South Coast takes annually to Brighton twenty-six tons of meat and 1,100 cattle; and here all the food carried *out* of London in bulk ends. A constant dribble of edibles, it is true, is continually escaping by the passenger trains, of which the railways take no notice in their goods-department traffic; but it must be remembered that a much larger quantity is perpetually flowing unheeded into the London commissariat through the same channels. Of the stout and porter brewed in the metropolis by the great houses, again, one-seventh perhaps finds its way abroad—a drop in comparison to that which must be contributed by the 2,482 smaller brewers of the town, and the great contingent supplied by Guinness, Allsopp, and other pale-ale brewers. This simple statement will suffice to make it evident that in the foregoing picture we have given anything but "heaped measure."

The railways having poured this enormous amount of food into the metropolis, as the main arteries feed the human body, it is distributed by the various dealers into every quarter of the town, first into the wholesale markets, or great centres, then into the sub-centres, or retail tradesmen's shops, and lastly into the moving centres, or barrows of the hawkers, by which means nourishment is poured into every corner of the town, and the community at large is supplied as effectually as are the countless tissues of the human body by the infinitely divided network of capillary vessels. According to the census of

1851, these food-distributors are classified in the following manner:—

Males.		*Females.*	
Grocers	6,475	Grocers	676
Cowkeepers and milksellers	3,372	Inkeepers	93
Cheesemongers	2,156	Inkeepers' wives	217
Butchers	7,428	Cowkeepers	1,158
Poulterers	551	Butchers	205
Fishmongers	2,238	Butchers' wives	3,086
Other dealers in animal food	1,376	Fishmongers	151
Greengrocers	3,325	Others dealing in animal food	283
Bakers	9,841	Greengrocers	941
Confectioners	1,806	Bakers	480
Other dealers in vegetable food	1,303	Confectioners	542
Brewers	2,499	Other dealers in vegetable food	939
Licensed victuallers and beer-shop-keepers, &c.	6,843	Licensed victuallers and beer-shop-keepers	970
Wine and spirit merchants	1,915	Wives of ditto	4,440
Other dealers in drinks	3,805	Wine and spirit merchants	15
Saltmakers	37	Other dealers in drinks	457
Water-providers	428		
Innkeepers	433		14,653
	56,601		

If to this total of 71,254 we add the wandering tribe of costermongers, hawkers, and stall-keepers, estimated at 30,000 persons, we shall have an army exceeding 100,000 persons; and, as indirectly there must be quadruple this number of persons employed, the merest pauper among the population has hundreds of invisible hands held out to provide him with the necessaries and comforts of life. The smooth working of this great distributive machine is due to the principle of competition—that spring which so nicely adjusts all the varying conditions of life, and which, in serving itself, does the best possible service to the community at large, and accomplishes more than the cleverest system of centralization which any individual mind could devise.

WOOLWICH ARSENAL.

In the year 1716 the brass guns which Marlborough had taken from the French were being recast in the royal gun foundry in Moorfields, when a young Swiss named Andrew Schalch, who was accidentally present, remarking the dampness of the moulds, and foreseeing the inevitable result, warned Colonel Armstrong, the then Surveyor-General, against being too close a spectator of the operation. As Schalch foretold, an explosion took place, and many workmen were killed. "It's an ill wind that blows nobody good," says the old proverb, and the bursting of the gun was the making of the young foreigner's fortune; for in a few days an advertisement appeared in one of the public papers requesting him to call upon Colonel Andrews, "as the interview may be for his advantage." Andrew Schalch attended accordingly, and was at once intrusted with the duty of seeking out a better locality for the casting of the royal ordnance. He selected a rabbit-warren at Woolwich, as the best site within twelve miles of the metropolis, for the threefold reason that it was dry, near to the river, and in the immediate neighbourhood of loam for the moulds. Strangely enough, it has since been proved that the great nation of antiquity with whom the British possess so many qualities in common, had been here before. The Romans, whose second station on the Watling Street out of London is supposed to have been at Hanging Wood, close at hand, seem to have appropriated the sloping ground on which the original gun factory stands for the purposes of a cemetery, for on digging the foundations of some new buildings urns of their manufacture were discovered in large quantities, and a very beautiful

sepulchral vase, which is now in the museum of the Royal Artillery Institution. Thus, where the conquerors of the old world lay down to their last rest, we, the Romans of the present age, forge the arms which make us masters of an empire beyond the dreams of the imperial Cæsars.

As the visitor enters the great gate of the Arsenal he finds no difficulty in tracing the whereabouts of the labours of Andrew, for straight before him, with a stately solemnity which marked the conceptions of its builder, Vanbrugh, stands the picturesque gun factory, with its high-pitched roof, red brickwork, and carved porch, looking like a fine old gentleman amid the factory ranges which within these few years have sprung up around. It is impossible to contemplate this building without respect, for forth from its portals have issued that victorious ordnance which since the days of George II. has swept the battle-grounds of the old and the new world. Up to as late a date as the year 1842 the machinery within these stately old edifices was almost as antiquated in character as themselves. The three great boring-mills, moved by horses, which had been imported in 1780 as astonishing wonders from the Hague, were the only engines used in England in making her Majesty's ordnance till eighteen years ago. Such was the state of efficiency of the oldest of the three great manufacturing departments of the Arsenal! The more modern departments, known as the Royal Carriage Factory and the Laboratory, have flourished during the present century in an unequal degree. For fifty years the former of these branches of the Arsenal has been more or less in a high state of efficiency, through the introduction of machinery from the workshops of Messrs. Bramah and Maudslay, and of the contrivances of Bentham and Sir I. Brunel. The improvements which were due to their inventive genius rendered this department highly efficient during the French war, on the conclusion of which a long period of inactivity followed; and it was not until 1847 that symptoms were manifested of renewed life under the able superintendence of General Gordon, and still later of Colonel Colquhoun. The Laboratory during the same period appears to have remained entirely stationary, and up to the year 1853 was far inferior to

that of any third-rate power. The backward condition of the sole arsenal of England during the long interval of peace seems at first sight remarkable, when we consider the amount of mechanical ingenuity which had penetrated into every factory in the kingdom; but when we remember that the instruments and munitions of war are special articles, wanted only for special periods, occurring at uncertain intervals of time, the wonder ceases. Private manufacturers had no interest in forging instruments of destruction, and the State having conquered "a lasting peace," Vulcan was allowed to fall into a profound sleep—a sleep so unbroken, that the nation listened for a moment to the voice of those Manchester charmers who would fain have persuaded us the time was come when our swords could with safety be turned into pruning-hooks. In the midst of this amiable delusion the Northern Eagle attempted to seize upon the sick man, and Britain instinctively flew to arms. This sudden spasm of war following upon a forty years' peace at once disclosed the fact that we were totally unprepared to wage it. There were not shells enough in the Arsenal to furnish forth the first battering-train that went to the East, and the fuses in store were of the date of Waterloo. A fourth part of the money which we joyfully expended when the wolf was at the door would have been thought the demand of a madman, when Europe was supposed to be one big sheepfold. Economy prevented efficient progress; and though the authorities had latterly originated reforms, their exertions were limited by their scanty resources. As the war proceeded, the Ordnance were at their wits' end for coarse-grained gunpowder, which, as it was not an article of commerce, had to be specially made for them. Small arms were wanted in haste, and could only be constructed at leisure. In these straits the private manufacturers of the country were applied to; but in many cases they had to learn a new art. Do what they would, with the power of charging fabulous prices for shot and shell, ammunition, and small arms, their powers of production were totally inadequate to meet the strain of the great siege, the proportions of which grew larger day by day. All the mills in England could not make powder at the rate at which

it was shot away—a rate which consumed 100,000 barrels before Sevastopol was taken; nor could all the armouries of London and Birmingham make rifled muskets and sabres fast enough for our men; consequently we were obliged to go to Liége for 44,000 Minié guns, 3,000 cavalry swords, and 12,000 barrels of powder, and to the United States for 20,000 barrels more.

It may seem passing strange that England, whose manufacturing power is so enormous, should have to resort to foreign manufacturers for the arms wherewith to fight. Money in such a country, it is often said, can procure anything, and money in this case was no object. The want of suitable machinery was the cause of the difficulty. The manufacturers could only make the articles demanded of them by skilled labour, which is a thing that must be acquired before it can be hired. Old machines can be put to extra duty; fresh machines can be readily supplied; but skilled labour is a fixed capital which cannot be suddenly increased. The result was a lamentable slowness of production and an extraordinary dearness of price—the munitions of war in some cases more than doubled in value. It is calculated that the shells for the Baltic fleet alone, which were fabricated entirely by private manufacturers, cost upwards of £100,000 more than they would have done had they been made by the new machinery lately introduced into the Arsenal. A still stronger case, to show the extraordinary prices which the Government had to pay contractors when the demand was impérative and supply confined to two or three houses, was that of the six-pounder diaphragm shells. They were charged by the contractors at 73*l.* per ton, whilst the very same article is now made in the Royal Laboratory at 14*l.* 19*s.* 2*d.* per ton. These exorbitant demands and the rapid drain of the stores led the War Department to consider whether it would not be better to organize a government establishment on the most extensive scale, and on the most improved system; and it was ultimately determined to adopt a plan by which it would be possible to expand or contract the productive power, according to the exigencies of the service, by means of machines which could be tended by untutored labourers and boys. Accordingly, a very

large number of the most ingenious machines were procured from the United States, where the Springfield and Harper Ferry Arsenals have long been famous for their admirable contrivances to save human skill; while others were procured from the Continent and at home by Mr. Anderson, the superintendent of machinery. In a very short time a powerful factory of the munitions of war sprung into life, verifying, for the ten-thousandth time, the truth of the proverb that necessity is the mother of invention, or at least, as in this case, of improvement.

The introduction of machinery on a large scale put to flight the old traditions of the Arsenal, and the manufacturing spirit had to be substituted for the military organization under which the establishment had been conducted before. Such was the energy and rapidity with which the old Arsenal reformed itself, that we question if any private factory in the kingdom is conducted upon a better system than is already at work there. Within these three years factories have sprung up on every side, and the whir of wheels, and the measured stroke of the steam-engine, can now be heard over the whole of its immense area.

The three manufacturing departments into which the Woolwich Arsenal is divided are as follows:—The Royal Gun Factory, the Royal Carriage Department, and the Royal Laboratory Department. Through these factories we will conduct our readers, and endeavour to give them an idea how human ingenuity has perfected the means to destroy human life. The gun factories, by right of age, take precedence, although in point of interest they present the least attractive features to the spectator. The fact which most strikes him as he threads his way amid the Cyclopean machinery is the slow, inevitable manner in which the different processes are carried on. Here you see a large lathe turning the outside of an eighteen-pounder, revolving as noiselessly and as readily as though it were only turning a brass candlestick—a fixed tool cutting off its thin shavings of metal with as much ease as if it were box-wood. In the next machine a gun is being bored, the drill twisting its way down the fixed mass, and a dropping

shower of bright chips proving how resistlessly its tooth moves on towards its appointed goal. A third machine cuts off the "dead head" of a cannon. All guns are cast in the pits in a perpendicular position, breech downwards, and are made at least one-third longer than they are intended to be when finished. The reason for this is, that the superincumbent metal forming the "dead head" of the piece may by its weight condense the portion below it which is to form the true gun—the extraordinary pressure of the powder requiring the metal to be extremely close in order to withstand the strain. Besides these lathes, which do the more ordinary work of the factory, there are what are termed exceptional machines, to finish those parts of the gun which the lathe cannot touch, such as the projecting sight, the trunnions, and that portion of the barrel which lies between them. No increase has taken place in the size of the Brass Gun Factory, although, through the energetic action of Colonel Wilmot, its produce has been doubled since the breaking out of the war: fourteen pieces of brass ordnance —six, nine, and eighteen pounders—can be turned out weekly. Brass is used for field-pieces on account of its resisting power being greater than that of iron. Experiments which have lately been made, however, tend to show that steel is a far lighter and better material even than brass for this purpose. A German, named Krupp, has produced some steel pieces which bear an enormous charge; in fact, when well made, it is almost impossible to burst them. The Emperor of the French has already ordered 350 of these guns to be introduced into the service, and probably we shall have to follow suit.

The fine building* recently erected in connection with this department is intended for the manufacture of iron ordnance, which has hitherto been produced exclusively by private manufacturers. The experience of the late war, however, determined the Government to furnish at least a portion of

* Since the above was written, these fine buildings have been taken possession of by Sir William Armstrong, where, under the veil of secrecy, his extraordinary ordnance is now constructed to the entire exclusion of the old style of cannon.

these stores themselves. A thoroughly reliable gun must be worth any price that its efficient manufacture demands; for the failing of a single piece may lose a battle, and bring with it consequences which would be cheaply averted by a park of artillery cast in gold. In the late campaign we were prevented from striking a great blow through this very cause alone. At the bombardment of Sweaborg no less than seventeen of the thirteen-inch mortars were destroyed through a want of tenacity in the iron of which they were composed. Many of these ponderous engines split after a few rounds, and may now be seen on the wharf of the Arsenal cleft in twain as clean as Tell's apple. Yet these mortars were made by the Carron and Low Moor Companies, the most celebrated private manufacturers of such articles in England. Had they stood the strain, we should have utterly destroyed the fortifications of this stronghold, instead of burning a few sheds, which made a great blaze without doing much mischief; and had we possessed a sufficient number of these formidable engines, the destruction of Cronstadt and Sevastopol would only have formed the work of a few days. Though ours is a land both of iron and manufactures, our guns are of inferior quality to those of other nations. The cannon captured at Sevastopol are of better iron than the cannon we brought against them. Several thousand tons weight of the guns dismounted from Cronstadt, in order to make way for pieces of heavier calibre, were bought, we understand, the other day by an English firm with the intention of converting them into cranks and boilers, which require the very best material. The Americans insist upon a tenacity of cast-iron for their ordnance equal to a pressure of 34,000 lbs. on the square inch, and sometimes obtain it equal to 45,000 lbs., whilst we, the greatest manufacturers of iron in the world, have hitherto seldom obtained it of a strength equal to 20,000 lbs. This great difficiency Government hope to remedy by the institution of a series of experiments on all classes of iron both foreign and indigenous. There is a curious machine in the Gun Factory specially invented for the purpose of testing the tenacity of each sample, its capacity of withstanding compression, its

transverse strength, and its power of resisting torsion. It is curious to see this iron-limbed Samson wrestling with mighty bars of metal, and twisting and tearing them across the grain like bits of stick. The fractured remnants of the specimens and of the guns rent in the testing process in the Marshes and at Shoeburyness are collected in a museum, the history of each specimen being minutely given. Thus a curious and instructive record is gradually being acquired, which will prove of infinite use in the manufacture of heavy ordnance. It has been already ascertained that guns are universally strengthened by having wrought iron rings put round them—a fact which was discovered during the course of experiments with the heavy cannon bored with an oval rifle to receive the Lancaster shell. Several of them having burst at the muzzle, this simple expedient was tried, and the guns so girded now bear the most extraordinary charges without flinching.

The new building for casting, boring, and finishing iron guns, is both externally and internally the most imposing-looking of all the structures erected to meet the exigencies of the Crimean war. These spacious factories present more the appearance of first-class railway termini than of ordinary workshops. They are lighted with what are termed saw-roof lights, having a northern aspect; for the Vulcans who can work all day in the burning blaze of furnaces do not, it appears, like to be distracted with the confusing rays of the sun! The number of turning, boring, finishing, planing, shaping, drilling, slotting, and punching machines that revolve, thump, and slide here in ponderous grandeur is prodigious, and there can be very little doubt that it will be the most perfect and powerful factory in the world of its kind. Travelling-cranes, which run upon railways poised in air overhead, command every inch of the factories, so that cannon of the heaviest calibre for both land and sea service—98-pounders weighing many tons can be slung from machine to machine with the greatest ease. When the machinery is completed, the foundry will be capable of turning out ten guns of the largest size per week.

The most interesting portion of the gun department is the

factory devoted to the construction of Lancaster shells. This odd-looking missile has a form very similar to a champagne bottle, and, unlike the ordinary shell, is made out of a single sheet of wrought iron. The slab of metal having been welded into a cylindrical form, is submitted to an ingenious lathe, which, acting upon it simultaneously with a dozen different tools inside and out, speedily reduces it to a given weight and a perfectly uniform thickness. The cylinder, about eighteen inches in length and ten in diameter, is then made red hot, and whilst in this state is placed in the grip of a powerful machine, which by a series of blows, equally distributed over every part, converts it into the likeness of a French bottle in less than five minutes, without the slightest sign of crumpling in any portion of the surface. The operation can only be compared to the manner in which a potter shapes a vessel upon the wheel. No less than forty machines are employed on this special manufacture, and upwards of a hundred shells can be turned out daily. The expense incurred in producing with extreme accuracy and speed these curious missiles for the first rifled gun adopted by the service, is an earnest of the determination of the authorities to carry the manufacture of artillery to the same perfection of finish as their small arms. Lancaster guns will in all probability play a very important part in the next war, if war there should ever unhappily be, as those in use in the Crimea made most splendid practice, firing with nearly the accuracy of a rifle, and attaining a range of 5,000 yards, or very nearly three miles. As these shells cost about 25*s.* each, the expense of "passing the bottle" to the enemy is rather a serious affair.

By far the largest department of the Royal Arsenal is devoted to the construction of carriages and packing-cases for moving artillery, baggage, and the various munitions of war. At the present moment the carriage department employs no less than three thousand hands, together with three hundred machines, moved by twenty-three steam-engines, which do the work of an additional twelve thousand men! The bulky nature of the material dealt with, and the store-houses required for stowing it away, together with the numerous workshops called into

existence by the Crimean war, have caused this department to burst its old bounds and to invade 250 acres of the adjoining marsh—the area of the workshops alone covering 255,152 superficial feet, and the entire ground occupied being no less than 1,445,440 feet. This immense amount of elbow room has enabled Colonel Tulloch, the superintendent of the department, to systematize the manufacture, and cause the timber to pass along in one unbroken progress from the time when it is landed upon the wharf to the time when the finished articles are delivered over to the storekeeper. If we follow this stream from stage to stage, we shall catch a flying view of the operations of this department, whose province it is to provide package and carriage for the British army at home and abroad.

The timber which forms the principal raw material employed is brought by ships to the mouth of the canal which runs along the eastern side of the Arsenal; here it is transferred to lighters which convey it some distance inland to the quay in the immediate neighbourhood of the timber field. By means of powerful derrick cranes, which can make a long or a short arm at pleasure, it is next unloaded and swung upon the trucks of the railway which ramifies through every portion of the premises, and forms the means of communication between its different points. The trucks, when full, immediately start with their burthen for the contiguous timber field, a square space covering 20 acres. Here the huge logs are deposited in long lines, which extend from one end of the field to the other, having roadways between them laid with rails. Over each line or row of timber strides a powerful travelling crane which, with a slight impulse given by one man, is made to traverse from end to end of the row, depositing or taking up in its way logs of oak or teak of many tons weight as easily as Gulliver could have picked up the Lilliputians he bestrode. Before the introduction of this powerful machinery, from fifty to one hundred pairs of horses were employed in this department alone, all of which are now dispensed with, and a saving effected of 6,000*l.* a-year.

The usual store in the timber-field amounts to 60,000 loads in various stages of seasoning. The varieties of climate in which the

British army has to serve are so many, that foreign woods have been introduced to supply the place of oak, which cannot be found in quantities equal to the demand. Thus we find in the timber-field sabicu, a dense East-Indian wood which is used for the heavy blocks of gun carriages; pedouk, from the same country, which is employed for a similar purpose; and iron bark, an Australian wood. Of English timber, such as ash, elm, and beech, there is a very large store. What is called wheel timber, on the soundness and proper adaptation of which depends the safety of the artillery and transport service, is entirely composed of the most graceful trees of our woodlands; the spokes being made of oak, the naves of elm, the felloes or rims of ash. Beech is also largely used for the fuses of shells and the woodwork of saddles. When any particular logs are required, they are selected by the timber-master, picked up by the travelling crane, hoisted into the railway truck, and conveyed at once to the saw-mills close at hand. On the threshold of the largest mill the logs meet with a grim reception from an immense circular saw 66 inches in diameter, which at once attacks the huge log and separates it as expeditiously as your Eastern soldier divides with his scimitar a floating handkerchief. This formidable instrument traverses a space of 30 feet, and is thus enabled to fix its teeth upon the log at whatever part of the entrance it may chance to lie. This transverse section performed, the divided portions are drawn up by machinery into the saw-frames, the largest of which is capable of receiving a log 4 feet square. Once within the mill's maw, as many saws are put in as are necessary to divide the wood into slabs of the required thickness, and a few minutes suffice to reduce it to planks. From the mills the timber is removed again upon the railroad to the seasoning shed, which covers 4 acres of ground. Here it is allowed to remain for years, so stacked that the air fairly circulates through every portion of the immense mass. The seasoning shed is to the timber master what his wine-cellar is to a *bon vivant*. Here he treasures his bins of nine years old oak as though it were wine of a famous vintage. This he keeps as carefully as a young whist-player

keeps his best trumps to the end of the game, but with far more judgment, for old oak is precious beyond price, and cannot be got for love or money at a moment's notice. In the dim shadow of this monster store are also piled the completed articles of land-transport that improve by age. That perpendicular wall of finished woodwork contains the bodies of a thousand carriages which were prepared to remove the British army from the pleateau of Sevastopol in anticipation of an inland campaign; the round towers at the corners are their wheels built up and left to season. Upon the thorough preparation of this part of the carriage its safety depends. The wheels of omnibuses are always allowed to remain two years before they are used, and by permitting them this grace they behave well when at work, generally running over 43,000 miles of ground before they are worn out. The wheels of gun-carriages require to be even better prepared and seasoned, as they have to bear the weight of enormous guns, and have often to run over the roughest ground, without being in any way relieved from sudden shocks by springs.

Upon this store of mellow wood the different factories draw; and the railway which traverses every portion of it speedily conveys the raw material to the benches of the workmen. As the visitor passes up the main avenues of these splendid shops he is bewildered with the activity of the swarms of artizans, the whirling of shafting, and the grating sounds of circular saws. Clouds of sawdust are flying about, and in a moment cover the intruder from head to foot. The immense amount of work sometimes required to be performed at a brief notice has necessitated the introduction of machinery into this branch of handicraft, which heretofore was entirely carried on by manual labour. Let us take the ammunition and powder cases for instance; these have to be provided by the hundred thousand in time of war, and accordingly we find machinery employed in every direction to shorten the work. Circular saws cut the planks into the required size to form the sides and tops and bottoms of the cases; as these issue from the different machines, they are conveyed away upon a circular band of canvas, placed at

right angles, to a broader band which runs from one end of the factory to the other: down this band, as on a broad stream, the various pieces sail until they reach the receptacle, from which they are again conveyed to the machinery which is to put them together. Here the drilling, mortising, and dowelling processes are carried on by wholesale with an exactitude and speed which would astonish the joiner of the old school. Upwards of a thousand ammunition boxes formed of cedar, for repelling the wood-eating white ants of the East, are now being prepared daily for the use of the Indian army. The powder-boxes for the navy are made of a hexagonal form, to enable them to fit into the ship's hold like cells of honeycomb. They are carefully lined either with pewter or copper, and when filled are hermetically sealed with wax. The limber-boxes for the field artillery are also made here in large quantities. These receptacles are of a far more elaborate character than the powder-cases, as they are fitted to take all the stores requisite for immediate action, which are stowed away in their different compartments, as neatly as the articles in a gentleman's dressing-case. The common cartridge barrels are shaped out of the solid wood almost as fast as you can look. One machine cuts the oak into staves, curved to the right form; another cuts the edges, so that they may fit in a circle; a fourth turns the head; a fifth receives the staves, which are placed by the attendant on end in the form of a barrel, within the grip of a hydraulic press, claps a hoop on the top and bottom, and with one squeeze completes the operation. By such appliances a piece of solid oak plank is converted within five minutes into a finished barrel. The total produce of carefully-prepared powder-cases during the financial year 1856 was 25,331, and of boxes for ammunition, shell, &c., no less than 287,171. How many barrels can be made at a pinch we do not know, for the machinery is only just put up, but the number must be enormous, and when the visitor witnesses the nimble fingers of machinery galloping over the work, he wonders how the business was ever got through in the old time of the chisel, gouge, hammer, and plane.

In the shops devoted to the manufacture of the gun-carriages and trucks for the land and sea service, skilled artisans are employed, except in the wheel department. The vast strength requisite to support and withstand the recoil of 56, 64, and 98-pounders, necessitates the most solid construction and the best workmanship. Some of these platforms for traversing cannon, made of teak, and bolted and finished at the ends with bright copper bands, look like handsome pieces of furniture rather than ship's gun-carriages. Compared with these ponderous articles, the light constructions fitted for the field-artillery seem like children's playthings. Here they may be met with in every variety and in every stage of progress, so substantially put together that the marvel is that they ever wear out. The sort of succession of earthquakes, however, to which they are subjected in a campaign tells even upon those solid joints, and but few of the gun-carriages employed in the Crimea, although new when they went out, returned fit for further service.

The wheel department is one of the most interesting sights in the Arsenal. Here the most ingenious machinery has been brought together to insure sound and speedy production. Formerly the wheels were made entirely by hand; now they are turned out without the aid of a single skilled wheelwright. What is called the copying process, produces the nave and spokes of the wheel, three or four of which are seen working side by side, and the whole batch under the care of only one man. The circular rim of the wheel, or felloe, is cut out of the solid block by an ingenious ribbon-saw, imported from France. This saw is merely a narrow band of steel, toothed on one edge and running over a wheel like an ordinary leathern band attached to shafting. The exquisite manner in which it fashions the most intricate patterns from thick slabs of wood is really surprising. The felloes, after being thus roughly formed, are stacked to season in a shed by themselves, where they are piled one upon the other in vast pillars, down vistas of which the visitor passes, full of amazement at their number. There are at present in store some sixty thousand of these felloes and

an equal number of naves, with their due complement of spokes.

As wheels are required, their component parts are brought to the shop, finished and mortised by machinery, and then lightly adjusted to each other. They are immediately placed within the grip of six hydraulic presses, which are so arranged as to thrust towards a common centre. Directly the wheel is adjusted within them, you hear the hiss of the resistless engines, whose motive power is only a few pints of water; the solid timbers groan, the joints painfully accommodate themselves to each other, and in less time than the process takes to describe, the wheel is lifted out solidly jointed, and only awaiting the tire to travel at once under its superincumbent gun. The wheels of gun, limber, and ammunition carriages are all made of exactly the same size, in order that they may be interchangeable in case of accident.

The effect of the sudden outbreak of the late war was, perhaps, more beneficially felt upon the laboratory department of the Arsenal than any other. Shells, of all the stores of war, were most deficient when the army left for Varna, and the want increased as soon as actual campaigning commenced. The authorities accordingly permitted Captain Boxer to erect a model manufactory of shells in the autumn of 1855. This he did with surprising rapidity, and proved to their satisfaction that these formidable missiles could be manufactured five pounds a ton cheaper than they could be procured from the contractors—an important saving on an article of which several hundred tons had to be supplied per day. The success of this experiment led to the erection of the splendid shell-foundry which is now attached to the Arsenal, and which is capable of turning out sufficient shells for all the armies of the world. Here may be seen the process by which the old scrap iron of the establishment is transformed into the finished shot and shell, and transferred by its own weight to the transport ready to convey it to the seat of war. The smelting process is carried on in a dozen enormous cupola furnaces, into which the iron and coal are heaped indiscriminately. The fierce heat generated

by the blast rapidly melts the iron, which is then allowed to flow into the shell-moulds. From the moment the metal enters these moulds, the shell, in war time, never touches the ground till it is landed at its port of debarkation! The rough shells, after they have cooled a little, are forwarded by railway to the cleaning-room, where they are placed in a revolving iron barrel, seven feet long and seven feet in diameter. This machine circulates with rapidity, and the friction of the contained shells speedily cleanses them of all sand and dirt. From this point they roll through all the succeeding stages of their manufacture. A slightly-inclined plane receives them at the cleaning-drum, and conducts them one by one to the machinery fixed in the great room of the laboratory department. Upwards of ten thousand shells per day passed through this apartment during the late war, and were, on their passage, drilled and "bushed," or fitted with the socket made to receive the fuse. This simple fact will alone serve to show how energetically the work was carried on to meet the wants of the great siege. The shells, having rolled through the labyrinth of successive machines which operate upon them, now move onward to the painting department, where they receive a coating of black varnish, which prevents oxidation. Hence they continue their journey right across the open ground of the Arsenal to the pier, under the platform of which they keep their course, inside an iron tube which leads immediately into the barge alongside the transport in the river. From this barge, into which they sometimes shoot with a considerable impulse, they roll again, through the open port of the ship, to their appointed place in the hold.

The chief factory of the laboratory department is the great sight of the Arsenal, as here the visitor witnesses twenty or thirty most curious operations, the more important only of which he can stop to examine amid the whirlwind of machinery that everywhere meets his sight and vibrates on his ear. The manufacture of elongated bullets for the rifles affords perhaps the most startling novelty of all. The rifle itself is not a greater advance upon old Brown Bess than is the Minié bullet upon the old one-ounce ball. The apparatus now employed to

produce it contrasts as forcibly with the simple bullet-mould formerly in use. Instead of heating the lead to a fluid state, it is simply warmed, in which condition it is subjected to hydraulic pressure in a large iron vessel, which has but one small aperture at the top, of the size of the intended elongated bullet. Out of this hole the metal is driven in the form of a continuous rod of lead, which, as it issues forth, rolls itself upon iron reels as though it were so much cotton! The reels are then attached to a machine which draws the metal between its teeth, bites it off to the required size, moulds the cone, depresses the cup, and condenses the mass at the same moment. These wonderful bullet-makers, when in full work, turn out five hundred elongated bullets a minute, or upwards of a quarter of a million daily. To complete the missile, the cup has to be filled with a boxwood plug to ensure its proper expansion whilst in the act of leaving the gun. Here again a partially self-acting apparatus is called into play, one lad being sufficient to feed several machines with square rods of wood, the ends of which are embraced by a circular hollow cutter, which instantly reduces them to the right conical form, and then cuts them off. These little plugs are produced at the same rate as the bullets.

An equally interesting operation is the manufacture of percussion caps. The first process in this light and delicate work is the stamping of sheet-copper into pieces of the required form to make the caps. For this purpose the copper is placed beneath the punch of the machine, and immediately it is put in action, small crosses of metal are seen to fall from it into a box in a continual stream, whilst the sheet itself is transposed by the punching process into a kind of trellis-work. These crosses of equilateral arms are now transferred to another machine, which instantly doubles up the four arms, and at the same time so rounds them, that they form a tube just the size of the gun-nipple, and by a third operation of the same machine a kind of rim is given to the free end, which makes the cap take the form of a hat. This rim marks the difference between the military and the ordinary percussion-cap—the soldier, in the hurry and confusion of battle, requiring this guide

to enable him to apply the proper end to the nipple. The metal portion of the cap completed, it is transferred to a man who fills it with detonating powder. As this is a very dangerous process, the artisan upon whom the duty devolves sits apart from the boys, who perform all the other work, for fear of an accidental explosion. To fix the fine dust in the cap, a very pretty machine is employed, which gets through its work with extreme rapidity. The caps are placed in regular rows in a frame-work, to which is attached a lever, armed with as many fine points as there are caps in a single row. The motion given by the hand alternately dips these fine points into a tray of varnish, and then into each succeeding line of caps. When the varnish is dry, the powder is fixed and effectually protected from the effects of damp. The caps are now finished, and are ready for the boy who counts and packs them. Machinery is even employed to perform the part of cocker, and with one gentle shake does the brain-work of many minutes. A frame is constructed, into which fit a number of small trays, each tray being pierced with seventy-five holes. Upon this frame the boy heaps up a few handfuls of caps, and then gives the whole machine a few jerks, and when he sees that every hole is filled with a cap, he lifts out each separate tray and empties it into appropriate boxes. In this manner he is enabled, with extreme rapidity, to count out his parcels of seventy-five caps, the regulation number served to each soldier with sixty rounds of ball-cartridge —the excess of fifteen being allowed for loss in the flurry of action. The British soldier's clumsy fingers are by no means well calculated for handling and adjusting such light articles.

Equally curious with the production of caps is the manufacture of cartridge-bags. The visitor, as he mounts the stairs to the upper floor of a large building close at hand, is made aware by the hum and collision of shrill young voices that he is approaching a hive of children, and as he rears his head above the banisters, he finds that he is in the midst of a little army of urchins, varying from eight to fourteen years of age, seated at long benches rolling up paper cartridge-bags. This process requires some little nicety, as each bag is made up of

three distinct papers of different sizes and shapes, which have to be neatly adjusted round a roller one upon another. By long practice some of these little fellows complete the operation in a surprisingly short space of time—rolling, twisting in the end, tying, and drawing it from the rod almost as quickly as you can look at them, the swaying of the body during the operation giving to the entire mass of eight hundred children a most extraordinary aggregate movement as the room is surveyed from one end to the other. Some boys are infinitely more nimble-fingered than others, and the sharpest earn eight or nine shillings a-week at the work.

Nimble as their little fingers ply, however, the hands of machinery laugh them to scorn. In the room below we note as we descend strange wheel-like frames revolving horizontally, and others working up and down into tanks of paper pulp. These are the new machines destined to supplant the little children over-head, and to hush the ceaseless hum of their human labour. Throughout the entire range of the Arsenal there is no sight more interesting than is exhibited by these machines, the *modus operandi* of which is extremely simple. Circles of brass tubing have short upright tubes inserted into them at regular distances. These upright tubes, or fingers, are pierced with fine holes, and the whole apparatus is attached to an exhausting-pump. Worsted mittens are fitted to the fingers, and when all is ready, the Briarean hand is dipped into the bath of pulp, the air in the tubes is withdrawn, the liquid necessarily rushes towards the fingers, and the water passing through, leaves the pulp adherent to the mitten. The process is instantaneous, hand after hand drops into the trough, gloves its fingers with pulp, and rises with a thousand cartridges in its grasp, quicker than one of the boys up stairs has finished a single bag. The process is not complete, however, until they are dry. Each mitten is removed from its metal finger, and placed on a similar one heated with steam. In ten minutes the desiccating process is finished, and the cartridge-bag is removed, a far more perfect instrument for its deadly purpose than that which is made up stairs by hand. The hint for this beautiful

machine was taken from the apparatus employed for making conical seamless sugar-bags without the intervention of the paper maker—so diverse are the developments which may spring from the same idea. Of these small-arm cartridge-bags, 400,000 can be manufactured in a day of ten hours; but as each cartridge is composed of a double envelope, one fitting within the other, in order to separate the conical ball from the powder, the product furnishes 200,000 cartridges—an enormous quantity, but scarcely equal to the demand of such campaigners as Havelock, whose men, day by day, consumed their sixty rounds per head. At first sight it seems strange to find the Government turned paper makers, and the visitor may think that these bags could be obtained, as the sugar-bags are by the grocers, from the private manufacturer, but it is absolutely necessary that they should be produced side by side with their deadly contents. They are far more delicate things to maintain in their integrity than even wafer-biscuits, which they very much resemble, and they are required in such enormous numbers, that any mechanical impediment, such as crushing, interposed to the filling of them with powder and ball, would add immensely to the expense. The pressure in packing necessary to convey them to the Arsenal would flatten, and hence destroy them.

But where, asks the visitor, is the small-arms factory for the construction of those far-famed rifles which prevented a disaster at Inkermann, and at once doubled the effective power of the steadiest infantry of Europe? And well may he ask the question, for what more natural place for this important manufacture than in connexion with kindred Government establishments? When the War Office decided upon erecting a factory to meet the sudden demands of the war, it was proposed by the Inspector of Machinery to plant it within the walls of the Arsenal; but the authorities, for some reason best known to themselves, decided otherwise, and it was accordingly taken to Enfield Lock, which is twelve miles from London on the Eastern Counties Railway, and where they had before a small establishment for the repair and manufacture of a limited number of muskets. The traveller who gets out at the factory

station finds himself at once in a road which leads him into a flat country laced with streams, where Paul Potter might have found a study at every turn. Here, amid flocks and herds peacefully grazing, or standing in the shadows of the pollard willows, he espies the tall chimneys of the Enfield factory, looking like a stray fragment of Manchester that had wandered out of its way. In all England a more absurd spot for it could not have been chosen.

The establishment, however, is so worthy of a minute inspection, that we will proceed to give a general view of the whole. The threshold of the manufacturing process is the smithery, where the foreman presides to deliver out the raw material and receive in return the work done. To each smith is issued the particular size of bar iron or steel required for the article he works upon. Opening out of this shop is the smithery itself, with its fifty-five forges, together with steam hammers, hoppers, rider hammers, and other contrivances by which our modern Vulcan economises labour. In this department all the iron and steel work of the lock and stock are moulded, for the ordinary method of forging conveys a very inadequate idea of the manner in which the material is here manipulated. Every sportsman knows that the lock of a gun is made up of many small pieces of irregular form. To forge these with the hammer alone would be far too expensive a process, as it would require highly-skilled labour, nor even then would it be possible to produce the different pieces of exactly the same size, so that any one may fit into any other with perfect accuracy when the gun is ultimately put together. To accomplish this end, the essential principle of the manufacture, each smith with his helper takes in hand a particular piece of work. One man, for instance, makes hammers, or cocks, as sportsmen call them. The irregular form of this part of the lock would seem to preclude the possibility of its being made by the hundred-thousand, each one being the counterpart of its brother to the thousandth of an inch. Yet this is done, and with an ease that appears astonishing to the beholder. Let us watch the brawny smith before us. He draws a rod from the fire at white heat, lays it upon

an indented part of his anvil, and, together with his mate, deals alternate blows in half a dozen different directions, and produces in a few seconds an irregular mass, which we see bears a resemblance to the indentation in the anvil, which, on closer inspection, we find to be a rude matrix of a guncock. This is the first process, called swaging. These two men go on from one year's end to another, giving alternate light and heavy blows and taps on all sides of the metal. These blows, though sometimes delivered through a swinging circle of eight or ten feet, fall upon exactly the same spot, for practice so nicely co-ordinates the muscles as to produce a motion as exact as that which draws from the bow of a Paganini the same delicate note for any number of times in succession. The cock thus swaged, the smith stamps his initials upon it, and transfers it to another smith, who works with a steam-hammer, on which is a steel die of the exact form it is required to take. A single blow of this instrument gives it its final form, leaving the superfluous metal in the shape of a thin film, where it has been squeezed into the opening between the dies, which is cut off by a subsequent stamping process. By this method of swaging and stamping, the lock-plate, bridle, cock, sear, trigger, sightleaf, breech-screw, and swivel are formed so perfectly, that the tool is scarcely required to touch them afterwards.

Those parts of the lock made of steel, such as the main-spring, searspring and tumbler, are simply swaged, the stamping process being omitted on account of the sudden blow tending to break the grain and thus destroy the elasticity of the metal.

A curious operation of the smithery is the bayonet forging. The bars for bayonet-work are never forged of such uniform width as to allow the smith to cut off to a nicety the length he requires. In order to rectify this difficulty, and enable him to tell how much will serve his purpose, he is provided with a water-gauge, or tube filled with a given quantity of water; into this the rod is plunged, and withdrawn when the fluid reaches the top of the gauge. By this expedient the iron, however irregular in form, is measured accurately by the displacement of the water. When the bar is withdrawn, the smith cuts it off at

the watermark, and his mate thrusts it into the forge fire. Whilst this is going on, the visitor becomes conscious of a strange machine close at hand, which perpetually gnashes together a mouthful of hardened steel teeth; this is that useful instrument called the rider hammer. These teeth bear upon their upper and under surfaces grooves of the form the iron bar is required to take. The short white-heated bit of bar is thrust in, and by a series of nabs is instantly lengthened a couple of inches; the next tooth still further attenuates it, the third forces it into the triangular form, and a fourth and fifth reduce it to the graduated length required: thus the blade of this terrible weapon is rough-drawn. The ring. by which it is attached to the barrel of the musket is forged separately, and welded to the shank at right angles. These are the first of at least seventy-six distinct operations before the weapon is fitted to fulfil its appointed design, that of making the ugliest and most irreparable wound possible in the human corpus. The work done, it is returned to the foreman, whose first duty is to see that the material with which the man has been debited has wrought into the requisite number of pieces; if it falls short the waste is charged to him. The next scrutiny is into the quality of the work, and the last and not the least important inquiry is, does it gauge? Unless the work passes all these ordeals it is rejected, and the person in fault is known by the distinguishing mark of the smith who prepared it. In some cases, as in the making of the bands which bind the barrel to the stock, this mark is ground off in passing through one of the presses; but is immediately restored, that the work may be traced to the artisan who constructed it. The effect of thus fixing the responsibility of every single thing manufactured upon the maker is immense, and induces habits of carefulness such as are seldom seen in ordinary workmen. The foreman now issues the different pieces to the finishers, who convey them to the annealing room, where they are rendered soft for working by heat, and cleaned of their scale or oxide, which would otherwise injure the tool, by means of dilute sulphuric acid.

The barrel is welded and finished in a separate factory. The piece of metal out of which the gradually tapering tube is ultimately fashioned seems to bear no relation to such a form. You see the smith take a small plate of quarter-inch iron, about a foot long by a few inches wide, heat it to a welding heat, and then place it between the lips of a rolling mill, with grooved instead of flat rollers, and in an instant it comes out a tube. It has next to be drawn out to the requisite length and tapered, which is done by passing it through a series of mills, each succeeding one being grooved smaller than the preceding. The bore is kept hollow during the operation by a central iron rod. The breech piece is welded on by a single blow of a steam-hammer, and the process of turning the bore begins. Four barrels are acted upon by one lathe, and the first operation is performed in fifteen minutes. Only a slight cutting is made each time, and the barrel has to be submitted to the action of many different boring instruments until the exact size, ·577 of an inch, is attained. The outside is now turned, the tool taking off the superfluous metal in one continuous ringlet of iron.

It now undergoes the most delicate process of all, that of being "viewed." The viewer, who is a highly-skilled workman, with an exceedingly accurate eye, puts himself opposite a gas-lamp, about thirty feet distance, and which has a dark shade on its upper side. Towards this object he directs the barrel so as to bring the dark edge half-way across his sight as he looks through the bore. By this device he is enabled to direct a ray of light with a defined edge down the tube, and by turning the barrel round, instantly detects the slightest deviation from the straight line. As the smoothest-looking sea is discovered to be a mass of dimpling ripples—(the Greek poet's "infinite laughings of the sea")—when the setting sun throws a golden shaft across its bosom, so the mathematically straight lines of light gauge the inequalities of the rifle bore in a more exact manner than any instrument that has yet been invented. When any irregularities are discovered, the viewer taps the barrel with a fine hammer on a small anvil, and

repeats the operation until the tube is perfectly true. Upon this depends the correct shooting of the gun, inasmuch as the least crook near the end of the bore would send a bullet far on one side of the mark long before it had attained the full range of 800 yards, to which the Enfield rifle is sighted. The rifling of the barrel in three groves is performed by fixing it in a lathe, and driving the cutter through it in a spiral direction.

In entering the finishing room, a noble apartment, 200 feet square, the visitor cannot fail to be struck with astonishment at the scene this vast workshop presents. He looks through a mass of wheels, levers, cranks, and shafts, which fill the space from wall to wall, every foot alive with iron and human limbs, and the whole superficies seeming to writhe and wrestle like a cluster of worms. Although confusion looks triumphant to the casual eye, the utmost order prevails. On one side of the room, at regular intervals, small inclosed offices, with glazed fronts, are placed against the wall, a little above the level of the floor. These are devoted to the foremen of the different divisions into which the work is separated. Each of these functionaries from his eyrie rakes the long avenues or streets of machines, with their attendant workmen, which run in parallel lines across the room. The first avenue is devoted to bayonets; then come in the following order the divisions allocated to furniture, screw, sight, lock, and stock. The work is so managed that all the different parts keep pace together, and are finished in the required proportions; or in other words, those pieces which are but slowly produced have allotted to them a greater number of machines. By this arrangement all the requisite items are brought at the same moment to the workmen who put them together in the finished article. The fifty-six pieces of which the rifle is composed work their way up one street of machinery and down another, constantly following on from right to left on their way towards the top of the room. Many of these pieces are passed through upwards of twenty different machines, each one performing some simple and definite action, by which means an accuracy is obtained that the most skilful gunmaker could never equal by hand.

The diversity of cutting-tools in these different machines strikes the observer with astonishment; the oddest shapes, the most unlikely-looking forms, proving admirably adapted for the purposes they are intended to accomplish. Many of these work automatically—that is, they engage and disengage themselves; setting to work only when they are fed with material, and, when their rodent-like teeth have gnawed away as much metal as is requisite, they stop of their own accord. The effect of this is so extraordinary, that it almost seems as if those bright limbs of iron, which stop and move on without human agency, must be directed by some sort of metallic brain. The most common form of tool employed is what is termed the circular cutter or milling-tool, which is constructed to fit every class of work. These cutters will continue serviceable for months without requiring to be sharpened, in consequence of each being restricted to its own limited sphere. The amount of thought employed in the construction of many of these machines must have been immense, and when they were completed, two-thirds of the manufacturing difficulty was overcome, and the musket more than half made. A most ingenious machine, the parent of a numerous progeny, was, many years ago, invented by an Englishman, and applied to copying the fine lines of statuary, and transferring them to ivory and other materials. The applicability of this instrument to the production of the irregular forms in the gun trade was first perceived by our cousins across the Atlantic, and for many years they have employed it for the rapid and true production of many parts of the musket, whilst our own manufacturers in London and Birmingham have been content to execute the same work, laboriously and expensively, by hand labour. The copying machines now at Enfield have been imported direct from America. They are principally employed in fashioning gun-stocks. They convert the rough slabs of walnut-wood, just outlined in the proper form, which come from France, Belgium and Italy, into the finished article, with all its grooves, holes, and beddings for lock and barrel. This extraordinary apparatus may be said to work with two hands: the one feeling the outline of the pattern to be copied,

the other directing a tool uniformly with it and cutting the object to the required form. Let us, for example, take the machine that hollows out the lock-bedding in the stock. Not only are the outlines of the most irregular form, but they are sunk to three different levels, and it would almost seem impossible that a machine should excavate so complex a bedding with minute accuracy. Nevertheless, it is done in a few minutes by an apparatus, which revolves and brings, one after the other, some new tool into play according to the work to be done. Whilst the operation is going on, a little blower clears out the chips as cleverly as though the machine had human breath. The different portions of the gun completed, they are, for the last time, gauged, and passed on to the extreme end bench of the factory, near the west door, where the "assembler," as he is termed, receives them in different bins, from which he takes the part he requires and sets up the gun. As there is no necessity for special fitting, this process is performed with remarkable rapidity, seven minutes being sufficient to combine all the different parts, which have never been near each other before—lock, stock, ramrod, and bayonet—into the complete weapon. They now pass out of the western door, packed in cases, and are taken to the proving-ground, where they are tested with high charges and their range and accuracy duly examined; and so perfect is the finish, that not one in a thousand fails to stand the trying ordeal. They are now transferred by water to the Armoury at the Tower, ready for service in the field.

The Enfield rifle was adopted for the public service in the year 1853, and is at the present moment the best infantry musket in Europe. There is still room, however, as Mr. Whitworth has shown, for improvement in the barrel. His rifle propels a bullet both farther and with greater accuracy, in consequence of the greater care he bestows upon the barrel, which, instead of being welded, is bored, at a great cost, out of the solid metal. Its diameter also being smaller, the bullet encounters a less resistance in the air during its flight. There is no reason why the smaller bore should not be substituted for

that of the Enfield rifle, when this arm would be perfect. The difficulty the ablest minds experience in getting out of an old groove was exemplified by the late Duke of Wellington with respect to this question of the size of bore. His Grace was obstinately wedded to Brown Bess, whose crushing fire, so superior to that of the enemy, he had witnessed in his Peninsular campaigns, and which he erroneously ascribed to the excellent quality of the arm instead of to the steadiness of the men—mistaking, in fact, a moral for a physical excellence. The longer the Commander-in-Chief lived, the firmer his faith in the large smooth bore, and the necessity for making a big hole in the enemy. When the rifle-musket of 1851 replaced this old arm, the large bore was still retained, and the consequence was, that the bullet, being elongated, was heavier than when round, and the soldier had to carry a missile of 696 grains weight, instead of 490 grains. The bore of the Enfield rifle pattern of 1853 was very properly reduced, and the Prichett expanding bullet, of 530 grains, now carries its deadly weight in its length. Though the wound it gives is not so large as that inflicted by the old ball, it makes up for deficiency by its power of penetration. An officer who was at the taking of the rifle-pits in the quarry before Sevastopol informs us that a brother-officer was shot through the side by a Russian Minié bullet, which afterwards passed through an ass, and his two panniers of water, and did not stop in its career till it had broken a man's arm at some distance off! Its deadly aim at vast distances, which made it the dread of the sepoys, who termed it "the gun that kills without making any sound," contrasts strangely with the performances of Brown Bess of old, which at any range beyond a hundred yards was so uncertain in its aim that it has been calculated that the soldier shot away the weight in lead of every man that he hit.

Before the breaking out of the war, our stores were hampered with small-arms of all sizes and patterns. There were, at home and abroad, no less than 109,725 flint-lock muskets, of fifteen different patterns, and 107,000 smooth-bore, percussion-lock muskets, of eight different patterns. Very many of these

were in service a few years ago; and as their bores were all dissimilar, it often happened that the soldiers were provided with cartridges that would not fit their guns. In peace little difficulties of this kind are of no moment, but they are of the utmost importance in the time of war. At the battle of Waterloo, the Brunswickers, who held Hougoumont, were, for a short time, rendered helpless, in consequence of cartridges having been sent to them that did not fit their muskets. A battle, which, according to Professor Creasey, ranks among the six decisive combats of the world, might thus have been lost on account of the misfit of a cartridge. The necessity of preventing the possible recurrence of such mischances induced the authorities, at the breaking out of the Russian war, to make the bore of all muskets used by the different branches of the service uniform with that of the Enfield rifle. A thousand of these weapons can at present be completed in a week—a number which appears large, but which is in reality far beneath the real wants of the army. The private manufacturers of small-arms in Birmingham denounced the establishment of this factory, on the plea that Government were not warranted in fabricating goods which the private trade of the country were capable of producing—an assertion which the Crimean war totally disproved, as the authorities were so pressed for rifles that they had to go to France,* Belgium, and the United States for supplies, and at one time contemplated giving an order for

* The French manufacturer who executed the order addressed a letter to one of the Emperor's chamberlains, from which we take the following extract:—"It is, I believe, the first time that England, who was hitherto regarded as able to supply the most unforeseen wants of her army, should find herself obliged to have recourse to French industry. I had it too much at heart to sustain the reputation of my country in the eyes of our rivals to leave anything undone towards the execution of an order which was intrusted to me, and I have had the satisfaction of receiving from the English Government the most flattering compliments. With a view to perpetuate the memory of that operation, which is almost an event in industry, I have ordered a medal to be engraved by M. Louis Merley, who gained the great prize at Rome, and who is one of the artists of whom France is proud. I desire earnestly to obtain the favour of presenting this medal to his Majesty the Emperor, as also the model of the rifles fabricated for England; and I pray your Excellency to be good enough to solicit for me an audience of his Majesty." The audience was granted, and the medal and the model of the fire-arm presented in due form.

350,000 rifles at Liége. The military rifle, like the shell, being a special article required only by the army, the demand for it in large numbers is not constant, and hence the low condition of the mechanical power brought to bear upon it by the trade. The gunmakers of Birmingham have depended upon skilled labour for the production of the different parts of a musket, and thus labour, in times of pressure, becomes exorbitantly costly, to the embarrassment and loss of the public service. It was this which led the Government to introduce machinery into the manufacture—a thing the trade declared impossible, but which they now see is not only possible but profitable, since the same musket for which they charged 4*l.* 10*s.* is now made of a superior quality by the Government for 3*l.* 15*s.* The experiment must be of the greatest importance to the Birmingham gun trade, which, through its own inherent vices, was fast yielding to the superior ingenuity of America and Belgium, and which can only regain its old position by taking a lesson from the organized mechanical resources of the Enfield Lock manufactory. The private manufacturers need not fear that Enfield will monopolize even Government work, the demands of the service being far beyond its productive powers. As the Ordnance supplies rifles to our army in India, as well as to the home and colonial force, no less than 400,000 are required for the infantry and marines alone: a number which has to be replaced every twelve years, even in times of peace. In active service the destruction is immense; and now the cycle of war has returned, the annual 50,000 rifles turned out by the royal factory will prove but a small instalment of the vast store of arms that England will require.

At Waltham Abbey, not half an hour's walk from Enfield Lock, is situated the only establishment for the manufacture of powder which the Government possesses. Here dispersion, instead of concentration, is the order of the day. The necessity for complete isolation causes the factories to be distributed over a very large space of ground, and the visitor has to walk from workshop to workshop through groves and avenues of willow and alder, as though he were visiting dispersed farm-buildings

rather than the different departments of the same manufacturing process. There are not perhaps more than a dozen detached buildings in the whole establishment, yet these are scattered over upwards of fifty acres of ground. To such an extent do meadows and woods and meandering canals predominate, that the idea of being in a powder-mill is entirely lost in the impression that you are walking in a Dutch landscape. The visitor who enters the great gates of the mill, impressed with a belief in the dangerous nature of the ground he is treading, is somewhat startled on finding a steam-engine at work on the very threshold of the factory, and a tall chimney smoking its pipe in what he supposed to be the vicinity of hundreds of barrels of gunpowder; but in reality these boilers and furnaces are placed many hundred feet from the mixing-houses. The English Government powder is composed of seventy-five parts of saltpetre, fifteen parts of charcoal, and ten of sulphur. The ingredients, being thoroughly powdered, prepared, and purified, are submitted to the action of a machine, which completely mixes them. The product is then conveyed by a covered boat, very much like an aldermanic gondola in mourning, some hundred yards along the canal to the incorporating houses, where the most important process of the manufacture is carried on, and where the danger of an explosion first commences. The incorporating machine is nothing more than a couple of runners or huge wheels, weighing four and a half tons each, which revolve one after another on their edges in a bed of metal supplied with a deep wooden rim, which gives it much the appearance of a huge kitchen candlestick. Into this dish the black powder is placed, together with a little water, which varies in quantity, from four pints in winter, when the atmosphere is charged with moisture, to ten in the summer, when the desiccating quality of the air is very great. For four hours this pasty mass is crushed, ground, and mixed by the action of the runners. The precautions taken against explosion teach the visitor the dangerous nature of the ground he is treading. Before he puts his feet across the threshold he must encase them in leathern boots huge enough to fit Polyphemus, and guiltless of iron in any form

whatever; even his umbrella or stick is snatched from him, lest the ferrule should strike fire, or accidentally drop among any part of the machinery whilst at work. The machinery is even protected against itself. In order to avoid the possibility of the linch-pins which confine the cylinders to their axles falling down, and by the action of "skidding" the runner, producing so much friction as to cause an explosion, receptacles are formed to catch them in their fall. As small pieces of grit, the natural enemy of the powder-maker, might prove dangerous if mixed with any of the "charges," the axle sockets of nearly all the wheels are constructed to expand, so as to allow any hard foreign body to pass through just in the same manner in which the fine jaws of the larger serpents are loosely hinged, to enable them to get over at one gulp such a bulky morsel as a full-grown rabbit.

Accidents will happen, however, in the best-regulated mills, and provision is made for rendering an explosion when it occurs as innocuous as possible. The new incorporating mills are constructed with three sides of solid brickwork three feet thick, and the fourth side and roof of corrugated iron and glass lightly adjusted. As they are placed in a row contiguous to each other, the alternate ones only face the same way, so that the line of fire, or the direction the explosion would take through the weakest end, would not be likely to involve in destruction the neighbouring mill. It does occasionally happen, however, that the precautions are not sufficient to prevent danger spreading. In the great explosion which took place in 1842 a second house was fired at a couple of hundred yards distance from the spot where the original explosion took place. There is now a further security against the houses going one after another, like houses of cards. Over each mill a copper tank, containing about forty gallons of water, is so suspended that on the lifting of a lever it instantly discharges its contents and floods the mill. This shower or douche bath is made self-acting, inasmuch as the explosion itself pulls the string, the force of the expanding gas lifting up a hinged shutter which acts like a trigger to let down the water. "But," it may be said, "as the water does not fall

until the explosion has taken place, this contrivance is very like locking the stable door when the steed is stolen!" And this is the case with respect to the mill where the original mischief took place; but the lever first acted upon discharges the shower-bath over the heads of all the others also, and by this means the evil is limited to the place where it originated. From the incorporating mills the kneading powder, or "mill cake," as it is termed, is taken by another funeral-looking gondola to small expense-magazines, where it is allowed to remain for twelve hours before being taken to the breaking-down house. Here the hard lumps of mill cake are ground into fine powder by the action of fine-toothed rollers made of gun-metal, which revolve towards each other and crush the cake which falls between them to dust. The broken-down mill cake once more travels between pleasant meadows fringed with willow until it reaches the press house, where the meal is subjected to hydraulic pressure between plates of gun-metal, and is thereby reduced to dense plates about half an inch thick. These plates are allowed to remain intact for a couple of days, by which time they become as hard as a piece of fine pottery. Very many advantages are gained by this pressure. The density of the powder is increased, which enables it to be conveyed without working into fine dust; its keeping qualities are improved, as it absorbs less moisture than if it were more porous; and lastly, a greater volume of inflammable gas is produced from a given bulk.

The pressed cake is now transferred to the maw of one of the most extraordinary machines we have yet witnessed. The granulating house, where the important process of dividing the powder into fine grains takes place, is removed very far away from the other buildings. The danger of the operation carried on within is implied by the strong traverse fifteen feet thick at the bottom, which is intended to act as a shield to the workmen in case of an accident. It was here an explosion took place in 1843, by which eight workmen lost their lives—in what manner no one knows, as all the evidence was swept away. To render the recurrence of such lamentable accidents as rare as possible,

the machine is made self-acting. At certain times of the day it is supplied with food in the shape of fifteen hundredweight of "pressed cake." This is stuffed into a large hopper or pouch, and the moment the monster is ready, the men retire beyond the strong traverse and allow it slowly to masticate its meal, which it does with a deliberation worthy of its ponderosity and strength, emptying its pouch by degrees, and by a triturating process performed by two or three sets of fine rollers, dividing it into different-sized grains. These grains it passes through a series of wire sieves, separating the larger ones fitted for cannon powder from the finer kind required for rifles, and depositing them in their appropriate boxes, which, when full, it removes from its own dangerous proximity, and takes up empty ones in their place. All the larger undigested pieces it returns again, like a ruminating animal, to its masticating process until its supply is exhausted. Then, and not till then, like Mademoiselle Jack, the famous elephant, it rings a bell for some fresh "cake." The workmen allow it about five minutes' grace to thoroughly assimilate the supply already in its maw, when the machine stops, and they enter with another meal. The floors of all the different houses are covered with leather neatly fastened down with copper nails, and the brush is never out of the hands of the workman: even while you are talking to him, he sweeps away in the gravest manner in order to remove any particles of powder or grit that may be on the floor; this he does mechanically, when not a particle of anything is to be seen, just as a sailor in a crack ship always holystones the deck, clean or dirty, the moment he has any spare time.

The powder thus separated into grains is still damp and full of dust. To get rid of this it is taken by water to the dusting-house, where it is bolted in a reel like so much flour. It has now to be glazed, a very important operation, performed by placing it in large barrels, which revolve with their load thirty-two times a minute for three hours together. By the mere friction of the grains against each other and the sides of the barrel, a fine polish is imparted to the surface of the grain, which enables it to withstand the action of the atmosphere

much better than when it is left unglazed. It is now stoved for sixteen hours in a drying-room heated by steam pipes to a heat of 130° Fahrenheit, and is then finally dusted and proved. There are many methods of proving, but the simplest and most efficacious is to fire the powder from the weapon it is intended to serve. Thus cannon powder is proved by firing a 68-pound solid shot with a charge of two ounces of powder—a charge which should give a range of from 270 to 300 feet. If the powder passes the test, which it generally does, it is packed in barrels holding 100 lbs. each, marked L. G. (Large Grain), and F. G. (Fine Grain), as the case may be, and carried to the provisional magazine. When 500 barrels have accumulated they are despatched in a barge to the Government magazine at Purfleet, near the mouth of the Thames, the Lea forming the connecting link of water between the canals of the works and that river.

The produce of this establishment, which had fallen so low as 4,500 barrels per annum in 1843, is now so increased by improved machinery that 20,000 barrels a year can be manufactured, and of the very best quality. Even this supply is far below the consumption during a time of war, and contractors have, and always will have, to furnish a portion of the required supplies; but it seems that a model mill is useful for the double purpose of keeping up a due standard of quality,* and of keeping down price. On the uniform strength of the powder depends the accuracy of artillery fire: hence the necessity of having some known standard of quality from which contractors should not be allowed to depart. The improvements which have taken place in the manufacture are very marked. About the year 1790, when powder was supplied to Government wholly by contract, the regulation weight of charge for a cannon was half the weight of the ball; it is now less than one-third: therefore two barrels are now used instead of three, a reduction of bulk which economizes stowage on board ship as well as in the field. Formerly powder had a range of 190 feet

* The merchants are provided annually with a sample of Waltham Abbey powder to guide them in their manufacture.

only; the range is now increased to 268 feet! This vast improvement is simply the consequence of the care with which the powder is worked, and the attention bestowed on every detail of the mills since their direction fell into the hands of Colonel Tulloh, Colonel Dickson, and Colonel Askwith, the present Superintendent.

There is a department at the Woolwich Arsenal to which we must now return, of which the establishments at Enfield and Waltham Abbey may be considered but outlying offshoots. Beyond the canal, at the extreme end of the ground, lie the establishments devoted to the more dangerous portions of pyrotechnic manufacture, such as the filling of rockets, of friction-tubes, the driving of fuses, &c. These ticklish operations used to be conducted in ill-built sheds in the laboratory square, where a sad explosion took place during the war, and Captain Boxer, determining to reduce the risk of accidents, transferred the whole of them in 1854 to this open space, far away from the neighbourhood of fire. The sixteen houses used for fuse-driving and friction-tube-making are isolated from each other much in the same manner as the incorporating mills at Waltham Abbey: we need not therefore describe them. The rocket manufactory is also so carefully arranged that accidents can rarely happen. The method of driving the composition into these frightfully destructive implements of war was, until lately, not only barbarous but dangerous in the extreme, being forced in by a "monkey," or small pile-driver, worked by eight men. The pressure of water now does the work silently, effectually, and safely. The rocket is so fixed while it is being filled, that in case of an accident the discharge will fly through the roof; grit and iron are as carefully excluded as in the powder mills; open spaces around the buildings are covered with turf and planted with shrubs, and a raised causeway of wood keeps the communications between the different magazines free from all substances likely to produce friction. The visitor may no more enter one of these carefully-guarded buildings with his shoes on than he could walk into the mosque of St. Sophia, at Constantinople, similarly shod. With equal care the process of greasing the

bullet end of the small-arm cartridges is carried on in this portion of the Arsenal. For a long time no lubricating material could be found that remained unaffected in all climates—a very important desideratum, considering the manner in which our stores of war are moved about from the depths of arctic waters to the burning summers of the torrid zone. Captain Boxer, however, in a happy moment, thought of the little busy insect that builds a store-house warranted to keep in all temperatures, and adopted bees' wax, which, added to a little fat, makes a compound which answers the purpose perfectly. The cartridges are dipped about an inch deep into a receptacle of this liquid kept fluid by the heat of gas. As we watched the process going on, we could not avoid reflecting from what insignificant causes great events arise, and that a rebellion which well-nigh snatched India from our grasp sprung from this very cauldron seething with "hell-broth thick and slab."

The different departments of the Royal Arsenal are separated by large open spaces, in which the rougher materials of war are deposited. The roadways, laid with iron trams, which greatly facilitate the transfer of heavy guns, are lined here and there with pyramids of shot and shell, lackered and shining in the sun. These missiles are continually circulating along the shoots from one spot in the Arsenal to another, passing at one time underfoot, at another overhead, the action of gravity being pressed into the service with other labour-saving contrivances, to remove 13-inch shells and 98-pounder solid shot, sometimes to very considerable distances. Vast as are the stores of these warlike implements, and far as the vistas of pyramids stretch (and there are no less than 688,000 in the Arsenal at present), they would speedily be drained by a short return of war, in which artillery now plays so prominent a part. At the siege of Sebastopol alone, which scarcely occupied eighteen months, no less than 253,042 shot and shell of all sizes were fired from our batteries, a number which the enemy surpassed, in one attack alone, if we are to believe the evidence afforded by some of the ravines, in which this iron rain descended so thickly that it paved the ground and prevented the grass from springing

up. The French were even more prodigal of these projectiles; for, according to the report made to the Emperor, 1,100,000 of them were sent by our allies into the doomed city.

The neighbourhood of each department is generally indicated by the class of war stores to be seen at hand. We may be sure we are near the great-gun foundry, for instance, when we see the long files of iron guns of all sizes and patterns, from the light 32-pounders to the truly formidable 98-pounders of the naval service, flanking the road, compared with which the light brass field-pieces that fringe the wall of the building itself seem the merest toy-guns. Here and there trim grass-plots are seen with a neat edging of three hundred 13-inch mortars, and at the grand entrance of the foundry itself enormous shells, a yard in diameter, prepared for Mallett's mammoth mortar, are planted, as if to show how daring are the ideas of modern war, which proposes to throw such Titanic missiles at the enemy. Here too may be seen veterans which have seen service—avenues of wounded guns from the Crimea. These are the picked specimens of the eighty-eight pieces of ordnance either disabled by the enemy or worn out by their own fire in that ever-memorable siege. One, a 68-pounder, was shattered by a singular accident; just as it was being discharged a shell fired by the enemy exploded in its mouth, and destroyed it after it had fired no less than 2,000 rounds. Another gun, which is split in the muzzle, was hit thirteen times. There appears to have been luck in this mystic number, however, for by the aid of an iron band the mishap was repaired, and it went on doing duty until one of its trunnions was knocked off, and even then, like the gallant Widderington, at Chevy Chase, it fought upon its stumps; for, on being sunk into the ground, and fired at a high elevation, it was kept at work up to the end of the siege. Some of these guns are pitted with cannon-shot even as far back as the breech, and one or two are hit in their very sternmost parts. These wounds are the result of ricochet firing, a kind of practice which enables a shot to drop in the most unexpected places.

In the mounting yard, as it is termed, which lies between

the gun and carriage factories, the field-pieces are mounted upon their carriages and fitted up for service previous to their removal to the depôt of artillery near the Common. Since the war the captured cannon from Sebastopol have been stored here preparatory to their being either broken up or distributed as trophies to the various towns of the United Kingdom. Of these guns 1079 are of iron and 94 of brass. They are of admirable metal, and would have proved very serviceable, except that unfortunately their bore does not suit any of our shot. Gun-carriages rent by the bursting of guns, or so unscientifically constructed as inevitably to destroy themselves, like the iron carriages taken from the enemy at Kertch, are kept as lessons for the Captain Instructor to dwell upon, when he takes round his bevy of young artillery cadets. This official performs the essential duty of giving the future artillery officer a clear insight into the method of constructing and repairing all the more essential engines and tools he will have to work with—such as guns, gun-carriages, &c., and of obtaining a general notion of the relative strength of metals, and of the value of the various materials out of which the munitions of war are formed. The vast workshops of Woolwich afford an admirable field for the acquisition of this kind of knowledge.

The neighbourhood of the Arsenal to the chief Military Academy in the kingdom gives these embryo artillery officers an opportunity of witnessing the experiments which are constantly going on in the Marshes, either for the purpose of testing new guns, or of practically examining the capabilities of new inventions. The extraordinary energy with which projectors of all kinds (clergymen among the number) devoted themselves to the task of inventing new implements of destruction during the Russian war entirely belied that lamb-like spirit attributed by Mr. Cobden to his fellow-countrymen. No less than 1976 new projects were submitted to the Select Committee of Ordnance with respect to artillery alone. Of this number a large proportion were of the most imbecile kind—such as proposals to fill shells with Cayenne pepper, chloroform, and cacodyle, the latter a most virulent material which has the

property of poisoning the air around it. The asphyxiating ball of the French was the true parent of the whole brood. Only forty-three of the propositions were favourably reported on, and of this number only thirty have been adopted into the service. First and foremost among these is the plan of filling shells with liquid iron. It is scarcely possible to exaggerate the destructive effect of this new application of an old material. At the second shot fired in the Marshes against a perfectly new butt which cost 200*l.*, it set it on fire and entirely destroyed it. The engines of the Arsenal and the old expedient of heaping earth against the burning wood were of no avail, the molten iron having penetrated in all directions deep into the timber. It is hard to believe that any ship will be able to resist the destructive effect of these shells, or that masses of men will be found courageous enough to withstand their devastating effects; for immediately the percussion shell comes in contact with any object, it explodes and throws the molten metal in all directions—splashing and striking objects that are completely out of the way of the contents of ordinary shells, and proving far more deadly both to animate and inanimate substances than the famous Greek fire of old. This very invention was brought to the notice of the authorities as early as 1803 by a workman in a London iron-foundry; but the suggestion was so contrary to all the current notions of the time, that it was rejected, and not heard of again until a new war brought into play more advanced ideas.

The new guns that were brought forward were innumerable, and many of them, such as the Mersey steel gun, and the great mortar, are still under trial. If this mortar, which is built up of a series of rings 9 inches broad and 3½ inches thick, laid over one another, and fitting tightly, so as to form a barrel, should ultimately prove capable of resisting the full charge of 70 lbs. weight of powder, it will be the most destructive implement yet invented for the purpose of crushing fortified places. In some of the trials which have taken place in the Marshes, it threw its 36-inch shell, weighing 26 cwt., upwards of two miles; and when the missile fell, it buried itself in the ground to so

considerable a depth, that after digging down 12 feet, and probing for 15 feet more, it still remained undiscovered. The artillerymen say jestingly that it has dropped down to Australia. No casemate at present in existence could withstand the crushing weight of its fall, and its bursting charge of 200 lbs. of powder.

After contemplating this vast establishment for the manufacture of arms, with its sixty steam-engines, which through the agency of upwards of three miles of running shafting, give motion to upwards of a thousand machines, we must not omit to mention the human labour which directs this enormous manufacturing power. During the height of the Crimean war, upwards of 10,000 men and boys were employed in the Arsenal, an army of workers engaged upon the production of the materials of destruction equal to the entire force encamped at Aldershot, and double the number of men that besieged and took Delhi. When such masses of men as this have to be dealt with daily, it is obvious how necessary it must be to possess an organized system by which the loss of what might otherwise be considered mere fractions of time is noted. Let us suppose, for instance, that every man and boy in the Arsenal lost only five minutes per day, and it would amount in the aggregate to the loss of the labour of one man for twelve weeks to the Government.

The next problem to be solved is how to pay 10,000 men in any reasonable time. It would be clearly impossible to calculate each man's wages at the time of payment, even if a little army of clerks were employed. It is therefore done beforehand by a staff of men employed for this purpose. The amount due to each person having been ascertained, the money is laid out on boards divided into partitions numbered consecutively. A corresponding number for each man, with the amount to be given to him, is distributed previously to the payment taking place, on what is termed a "pay ticket." On pay-day the artisans take their places in single file, arranging themselves according to their numbers, and, passing in front of the pay-boards, receive their wages, and surrender their tickets, which are receipts for the money. No money is exchanged if not

brought back before the man reaches a certain point, and in this space there are persons stationed to watch that no exchange is made of bad money for good. To search every man as he left would be impossible, yet it is highly necessary to have some means of checking petty depredations of metal, &c. Formerly peculations of this kind were constant, and the aggregate loss must have been immense. When it was first determined to put a stop to it, the men were told only a few minutes before leaving work that they would be searched as they went out. The effect of this announcement was that the whole Arsenal was strewed with small pilfered articles thrown hastily away. Now a couple of policemen at the gate touch indiscriminately a certain per-centage of the men as they are going, and these have to pass through a side lodge to be searched. As no man can tell whether or no he will be touched, the whole mass is kept honest. The mere lodging of such a body of men was at first a difficulty, even in so large a town as Woolwich: the demand, however, soon produced supply, and the means taken to insure the fall of Sebastopol caused the rise of a new town of at least two thousand houses in the immediate neighbourhood of the Arsenal.

Complete as we have shown the organization of the Arsenal to be, both as regards its mechanical resources and its staff, it is generally understood that the Government do not intend to depend upon it wholly for the supply of the munitions of war. In the case of small-arms, its powers, as we have seen, are wholly inadequate to the task. In those branches, however, where the manufacturing power is ample, they will not attempt to push it to the point of excluding the private manufacturer from a share in the business. This is, we think, a wise decision; for, however excellent may be the present arrangements now everything is new and the broom is fresh, it cannot be denied that the tendency of this and all other Government establishments is to go to sleep, since they neither possess the stimulus of private gain to teach them economy, nor that unity of direction which gives such vigour to private enterprises. The principle of competition ought therefore to be kept up, and we

should run the private manufacturer against the public one in order to keep down price, and pit the Royal Factory against the trade in order to keep up quality. Another great gain will accrue from the determination of the Government, which is, that the private manufacturers will not lose the art of making certain stores of war—an art which can not be learned in a day. It would be unwise for the authorities to put all their eggs into one basket, and this they would most assuredly do by entirely depending upon their own powers of production, and in disassociating themselves from the great and fertile manufacturing power of England, which generally knows so well how to economize and progress.

If the Government have shown judgment and foresight upon this point, we cannot say as much for their inexcusable neglect to provide for the security of this enormous establishment, which contains within its walls not only the principal depôt of warlike stores in the island, but also the means of producing them. We do not believe that our neighbours are going to sail up the Thames quite as easily as the Dutch did, or that any foreign army marching from Dover could destroy the Arsenal on its way to the capital without our having ample notice of their approach. Nevertheless we cannot think that the sole Arsenal of England, placed as it is in a very accessible part of the island, should be left entirely without the means of defence. The place itself could not be fortified, as it is commanded by the heights of Shooter's Hill; but the neighbourhood is admirably adapted for the purpose. In the opinion of military engineers, it would not be necessary even to erect the requisite works until the moment their services were required. Half a dozen earth batteries, mounted with heavy guns, would command all the land approaches; and a few flats, posted so as to sweep the reaches of the river, would effectually prevent the approach of any hostile force by water. The scheme of these batteries should, however, be settled beforehand in all their details, so that in the moment of danger they could be completed almost in the presence of the enemy, in case an invader should give the Channel Fleet the slip some misty morning, and succeed in making good his footing upon our shores.

SHIPWRECKS.

THERE is no nobler or more national sight in our island than to behold the procession of stately vessels as they pass in panoramic pride along our shores, or navigate the great arterial streams of commerce,—to witness the deeply-laden Indiaman warped out of the docks, or to see the emigrant ship speeding with bellying sails down Blackwall Reach, watched by many weeping eyes, and the depository of many aching hearts. It would, however, spoil the enjoyment of the least-interested spectator if the veil could be lifted from the dark future; if that gallant Indiaman could be shown him broadside on among the breakers; or that stately vessel, with bulwarks fringed with tearful groups looking so sadly to the receding shore, were pictured by him foundering in mid ocean—gone to swell the numbers of the dismal fleet that yearly sails and is never heard of more. Sadder still would be his reflections if another passing ship could be shown him, destined perhaps to circle the globe in safety, and when within sight of the white cliffs of Albion, full of joyful hearts, suddenly, in the dark and stormy night, fated to be dashed to atoms, like the *Reliance* and *Conqueror*, on a foreign strand. If such dramatic contrasts as these could be witnessed, we should without doubt strain every nerve to prevent their recurrence. As it is, the sad tale of disasters at sea comes to us weakened by the lapse of time and the distance of the scene of the catastrophe: instead of having the harrowing sight before our eyes, we have only statistics which raise no emotion, and even rarely arrest attention. In connection with these annual returns there is published a fearful-looking map termed a wreck chart, in which the shores of Great Britain and Ireland are shown fringed with dots,—

the sites of wrecks, collisions, and other disasters. From this

we perceive how all the dangerous headlands and sandbanks of the coast are strewn with—

> "A thousand fearful wrecks,
> A thousand men that fishes gnaw'd upon;
> Wedges of gold, great anchors, heaps of pearl,
> Inestimable stones, unvalued jewels—
> All scatter'd in the bottom of the sea."

Strange to say, these dismal finger-posts to marine disasters are generally found grouped around the sites of lighthouses. If we analyze the chart for the year 1857, we perceive at a glance the relative dangers of the three seaboards of triangular England; and that a fatal pre-eminence is given to the East coast. Out of a total of 1,143 wrecks and casualties which took place in this year, no less than 600, or more than one-half, occurred between Dungeness and Pentland Frith. Along this perilous sea, beset with sands, shoals, and rocky headlands, no less than 150,000 vessels pass annually, the greater part ill-constructed, deeply-laden colliers, such as we see in the Pool, and wonder how they manage to survive a gale of wind. The South coast, extending from Dungeness to the Land's End, is comparatively safe, only 84 wrecks having taken place in 1847; whilst from the Land's End to Greenock, where the influence of the Atlantic gales is most sensibly felt, the numbers rise again to 286, and the Irish coast contributes a total of 173.

If we take a more extended view of these disastrous occurrences by opening the wreck chart attached to the evidence of the select committee on harbours of refuge, given in 1857, containing the casualties of five years from 1852 to 1856, both inclusive, we shall be better able to analyze their causes. Within this period no less than 5,128 wrecks and collisions took place, being an average of 1,025 a year. According to the evidence of Captain Washington, R.N., the scientific and indefatigable hydrographer of the Admiralty, these casualties consisted of

	Vessels.
Total losses by stranding or otherwise	1,940
,, ,, collisions	244
Serious damage having to discharge	2,401
Collisions with serious damage	543
	——5,128

The total losses from all causes, therefore, amounted to 2,184 vessels, or to an average of nearly 437 in each year. The destruction of life consequent upon these casualties was 4,148 persons, or, upon the average of five years, nearly 830 in each year. In 1854 no fewer than 1,549 persons were drowned.

How such a calamity should have been so long tolerated in a civilized country, without any proper attempt at a remedy, it is not easy to comprehend. Still more incomprehensible, in a trading country, is the apparent disregard of the pecuniary sacrifice. It appears in evidence that the loss by total wrecks is estimated at 1,000,000*l.* a year at least, and by other casualties at 500,000*l.*, making together 1,500,000*l.* as the annual loss to the country from the accidents on our own coasts—a sum which in two years would be ample to build all the harbours of refuge that are needed around our shores.

The first step towards a remedy for this state of things is to inquire into the causes of shipwreck. There can be little hesitation in naming Marine Insurance as the chief destroyer. Unseaworthiness and overloading of vessels; their being ill found in anchors, cables, sails, and rigging; defects of compasses, want of good charts, incompetency of masters, may all be attributed to this source. If the shipowners were not guaranteed from loss, they would take care that their vessels were seaworthy, commanded by qualified persons, and furnished with every necessary store. The terms of the insurance, moreover, offer a direct premium to create in all cases of casualty a "total loss." For instance, a ship strikes the ground and becomes damaged, but, under able management, might be got off and repaired. In this case, however, the assured has to bear one third part of the loss; whereas, if the loss is total, he gets the whole of his insurance. Under these circumstances, even when there is no deliberate desire to perpetrate a wrong, the captain will leave the ship to her fate instead of using his energies to preserve her to the detriment of his employer. It is the opinion of many that if the insurers were to agree to pay the whole insurance, whether the damaged vessel were got off or not, that we should see a marked diminution in the list of total losses at

sea, for the natural inclination of the captain to save his ship would then no longer be counterbalanced by his desire to save the pocket of the owner.

There is a class of casualties, however, which are the product of villany, against which we see no protection excepting in the vigilance of the insurers: we refer to those cases of wilful casting away, which are not unknown even in this country, as the late trial of a captain, at the Old Bailey, will testify; but which are most frequent on the Florida Reef. It is notorious that our American friends are in the habit of sailing ships into these waters, with the deliberate intention of steering them to destruction. So well is this known, that those on shore can predict, with tolerable accuracy, from the handling of the vessel, whether she is about to be sunk or not. When it is not the skipper's interest to lose his craft, he will allow the wreckers, who swarm as plentifully as sharks in those waters, to act as pilots, and to put the ship in dangerous positions for the purpose of making a claim for salvage, which the swindling captain shares with them. In the years 1854, 1855, and 1856, 189 ships were either lost or put into Key West. The salvage upon the latter class amounted to 298,400·05 dollars, a large portion of which was, without doubt, obtained by fraud. It is far from our purpose to insinuate that the Americans are worse than their neighbours in this particular; had the English the same opportunity, there would always be found persons to enter upon similar practices. The memory of wrecking is not yet extinct in Cornwall, and only a few years since it was notorious that the pilots of the Downs were in the habit of recommending the cables of the vessels in their charge to be slipped in very moderate gales of wind, because these worthies had a good understanding with the chain and anchor makers of the neighbouring ports who would have to supply fresh tackle.

It must be admitted, that the same cause which prompts these villanies, operates in some measure as an antidote. The underwriters at Lloyd's and the different marine insurance offices, act in a certain degree as the police force of the seas. Their agents are as plentiful and ubiquitous as flies, and there

is no port of the old or new world without one or more of them. Through the medium of these marine sentries, whose eyes are always upon the ocean, disasters at sea are speedily made known to the underwriters, and in those cases where the telegraph is at hand, a ship has scarcely broken up or come ashore, before hundreds are reading the account of the disaster upon the "Board" at Lloyd's. With this spider-like web of intelligence spreading from port to port and from ocean to ocean, the chances of wreckers either on shipboard or on land must certainly diminish. The acuteness of the underwriters, sharpened by self-interest, is brought to bear upon the distant point, and all the resources of a powerful corporation are put in force to detect fraud when suspected, and to punish it when confirmed. A singular instance of the vigour and ingenuity displayed by their agents in pursuing the marine robber was afforded by the case of the American ship *W. T. Sayward*. This vessel was reported by her skipper to have been lost off Loo Choo, on her voyage from San Francisco to Shanghai, and the sum claimed of the insurers in this country was £50,000, the value of the cargo, which was reported to have comprised, among other things, 50,000 Carolus dollars. It struck the gentleman engaged to settle the claim that it was very unusual to ship such a quantity of this "Pillar" dollar, and on inquiring of the money-changers, he learnt that there was not a tithe of that number at present in existence out of China. This discovery at once aroused suspicion, and agents were sent to the spot where the ship had been lost, when it was found that the sailors, suspecting some roguery, returned to the wreck after the captain had departed, dived into her hold and discovered that she had been wilfully scuttled. They lighted, by happy chance, upon some of the boxes in which the "dollars" were shipped, and they were found to contain only iron nails and leaden bullets. The nails were selected for the sake of the chink. The assured, having heard of what had occurred, never ventured to repeat their claim.

In a more recent case, that of the brig *Cornelia*, a regular trader between the coast of Mexico and San Francisco, which

was wilfully scuttled off San Quentin on the 27th of March last, it was reported that she had 48,000 Mexican dollars on board, 19,000 shipped at Mazatlan by an English house, and 29,000 by other persons. On the captain's own confession the 19,000 dollars were removed by him just before he scuttled the vessel, and hidden in the sand at Cape San Lucas, on the coast of Lower California; the remaining sum of 29,000 dollars he admitted had never been shipped at all, bills of lading having been fabricated, and a mythical consignee improvised for the occasion. Had not the agent been on the alert, this knave would have robbed the underwriters at one swoop of 48,000 dollars.

From the chief moral, or rather immoral, cause of shipwreck and loss at sea, we pass to a consideration of the physical agents which act directly in producing these disasters. Of these there are so many, and of such various natures, that it is difficult to group them. Currents of the ocean, fog, lightning, icebergs, sandbanks, water-logged ships, defective compasses, and imperfect charts, are all dangers which beset the path of navigators, and especially of such as have to run the gauntlet in ill-found ships. The effect of currents in taking the sailor out of his reckoning is an old, and formerly perhaps a frequent, cause of shipwreck. This source of danger is now much obviated by the more intimate knowledge we are acquiring every day of the general laws which produce the currents. One of the most effectual as well as simple methods of detecting surface currents is that known to seamen as the bottle experiment. This has been practised since 1808, but more especially of late years, and has been deemed of sufficient importance by the Admiralty to justify an order by which all Her Majesty's ships are enjoined to throw bottles overboard containing a paper, on which is noted the position of the ship and the time the frail messenger was sent forth on its voyage. The bottle, carefully sealed up, traverses the ocean wherever the winds and surface-drift may carry it, and, after a passage of longer or shorter duration, is perhaps safely washed by the tide upon some beach. Without doubt many are smashed upon the rocks, others again are sunk

by weeds growing to them, some are destroyed by the attacks of birds or the jaws of hungry sharks, or if by chance they avoid all these dangers, they may be consigned to oblivion upon an uninhabited shore. It is estimated, however, that at least one-tenth are recovered. A collection of upwards of 200 has been made at the Admiralty, and are laid down in a chart called the Current Bottle Chart.

A single glance at this chart displays the principal well-known currents of the Atlantic ocean. The general tendency of the bottles to go to the eastward in the northern parts of this sea, and to the westward in lower latitudes, is at once apparent. It is equally evident that to the southward of the parallel of 40° N. on the eastern side of the Atlantic the bottles drift to the southward, while those again in the vicinity of the Canaries and Cape Verd Islands take a westerly direction. Those further south, lose themselves among the West-India Islands, and some penetrating further are found on the coast of Mexico, between Galveston and Tanessied. A few manifest the effects of the counter-current of the celebrated Gulf-stream, while others again, on the western side of the Atlantic, from about 40° N., are set to the eastward. Indeed, there seems to be a determination of all to the northward of the parallel of 40°, or that of Philadelphia on the American seaboard, to make their way to the eastward—some to the coast of France, in the Bay of Biscay, others to the western shores of Great Britain and Ireland, and others again to the shores of Norway.

We thus recognize distinctly, first the Portugal current, setting southward; then the equatorial current, influenced by the trade winds; then the extraordinary effects of the waters of the Gulf-stream flowing northward along the American coast, over the banks of Newfoundland—one portion following its north-east course and penetrating to Norway, and another continuing easterly into the Bay of Biscay. But let us particularize a few of the remarkable journeys made by these glass voyagers over the deep. The *Prima Donna* was thrown over off Cape Coast Castle, on the west coast of Africa, and after a voyage of somewhere within two years was found on the coast

of Cornwall. Now, to have arrived there, it must have been carried eastward by the well-know Guinea current, and reaching the Bights of Biafra and Benin it would meet the African current then coming from the southward, with which it would recross the equator and travel with the equatorial current through the West-India Islands, and getting into the Gulf-stream, would be carried by this to the north-east, and thus would be landed on the Cornish coast, after making a detour of many thousand miles. But curious as this is, it is not the only instance, for we find that the *Lady Montagu*, setting out in nearly 8° S. lat., about midway between Brazil and Africa, a position which would fairly place it in the equatorial current, made the same voyage, but landed at Guernsey, having accomplished the course in 295 days, or between the 15th October, 1820, and the 6th of August, 1821. Confining ourselves now to the area included between 30° N. lat. and the equator, the general effect of the heat of the Gulf of Mexico in forcing the waters thither is plainly indicated by the direction which the bottles have followed that are included within those limits. Those thrown overboard in the Mexican Gulf, to the north of Cape Catoche of Yucatan, are hurried away with it and cast on the American shore, near St. Augustine and Charleston. Other instances show the effects of the counter-current of the Gulf-stream on its eastern or ocean side, in driving bottles to the south-east, a current that must have affected the ships of Columbus in his first discovery, and which, upon his return northward among the islands, without doubt met and opposed his progress.

A curious example of the effects of the wind on the surface-waters is shown by a bottle thrown over from H. M. S. *Vulcan* in the midst of the Gulf-stream, about 130 miles southward of Cape Hatteras. The ship was on her way to Bermuda, where she arrived, and the bottle, instead of being carried by the current to the north-east like others, actually went after her and arrived at Bermuda also. But we find noted on the paper that a strong northerly wind was blowing when the bottle started. This must have been sufficient to have checked its

progress to the north-east, but allowed it to approach the eastern border of the Gulf-stream, whence it would drift into the eddy or counter-current, and thus become thrown on Bermuda. Again, between the Gulf-stream and the American coast bottles have found their way to that shore, while those to the northward of the parallel of 40° have invariably gone eastward; and many thrown over near the meridian of 20° have drifted into the Bay of Biscay, and been cast on the French coast.

Among the numbers of bottles which have travelled westward with the equatorial and tropical current two are remarkable, as being thrown overboard about 700 miles from each other and yet arriving at nearly the same destination. They were thrown from sister-ships when on their errand of carrying relief, by way of Behring Strait, to Franklin and his devoted crew. The first was dropped from the *Investigator*, Sir R. Maclure, in lat. 12°, long. 26°, the 27th of February, 1850, and was found on the 27th August following on Ambergris Cay, on the Yucatan coast; the second was sent afloat on the 3rd March, 1850, by Captain Collinson, in the *Enterprise*, in lat. 1° N., long. 26° W., and drifted to the coast inside of that cay, about 30 miles to the northward of it. That the two bottles should take their western course was to be expected; but that they should have gone to resting-places so near each other is singular, considering that their points of starting were so far asunder.

The Gulf-stream, the limits of which are so clearly intimated by these little messengers, is but a sample of a grand system of currents which are produced by the unequal temperature of the different zones. These currents of hot and cold water are accompanied by atmospheric changes equally extraordinary; and, taken together, they largely affect the course of the navigator from the old to the new world, and, not unfrequently, are the cause of the most fearful shipwrecks.

Lieutenant Maury, in his Physical Geography of the Sea, has boldly likened the causes at work to produce the celebrated Gulf-stream to the mechanical arrangements by which apartments are heated. The furnace is the torrid zone, the Mexican Gulf and the Caribbean Sea are the caldrons, and the Gulf-

stream is the conducting-pipe by which the warm water and the air above it, are dispersed to the banks of Newfoundland and to the north-western shores of the old world.* By this beneficent process the cold of our northern latitudes is greatly ameliorated. The waters sent north and north-east are edged by return currents, the one finding its way close to the banks of Newfoundland and along the seaboard of the States, and the other returning by the North Sea, the Bay of Biscay, and the west coast of Africa, until about the latitude of the Cape de Verdes it crosses westward again to fill up the void caused by the waters issuing from the Gulf of Florida. Thus the grand circuit is for ever maintained, not always, however, exactly in the same form, but varying according to the season. In the winter, the cold current coming S.S.W. along the Atlantic coast of North America is greatly augmented, and pushes the Gulf-stream further to the south-east. With the return of summer this stream, in its turn, thrusts aside the waters coming from the Polar Ocean. Between these two periods the trough of the Gulf-stream, to use Lieutenant Maury's forcible expression, "wavers about in the ocean like a pennon in the breeze." The temperature of the Gulf-stream, even in the winter, is at the summer level as it runs between two walls of nearly ice-cold water. Sir Philip Brooke found the air on either side of it at the freezing point, at the same time that that of the stream was at 80°. This difference in the temperature of air and water is probably the cause of those terrible hurricanes that occur in the Atlantic and among the West-Indian Islands, and which make it the most dangerous navigation, during the winter, in the world. The average of wrecks on the Atlantic seaboard of the United States during these rigorous months is not less than three a day. Sailors term the Gulf-stream "The weather-breeder;" and well they may, considering its frightful effect in producing commotion in sea and air. In Franklin's time it was no uncommon thing for vessels bound in winter

* We may more truly liken the system to the warming apparatus of a hot-house. The hot waters of the Gulf, conducted across the Atlantic, are the forcing power which stimulates the vegetation of Cornwall, whence the London market is supplied with its early vegetables.

for the Capes of Delaware to be blown off land, and forced to go to the West Indies, and there wait for the return of spring before they could attempt to make for this point. The snow-storms and the furious gales which greet the ship as she leaves the warm waters of the Gulf and nears the shores of North America, are quite dramatic in their effect. One day she is sailing through tepid water, and enjoying a summer atmosphere, the next, perhaps, driving before a snow-storm, her rigging a mass of icicles, and her crew frozen by the piercing blast. The Gulf-stream is answerable for another phenomenon —the fogs which invariably shroud the Banks of Newfoundland, and which render the approach to the North-American coast in winter so particularly dangerous. The hot water of the Gulf-stream gives up its vapour to the cold air, and hangs about the coasts an impenetrable curtain, which baffles the navigator's skill, renders useless his chronometer, and but too often sends his bark to destruction upon the hidden shore.

Another danger of the stormy Atlantic arises from the flow southward, in the spring and summer months, of icebergs. These stupendous masses have their breeding-place in Davis's Strait, from which they issue in magnificent procession directly the current increases in a southerly direction. Polar navigators have been surprised to find these huge monsters moving against the wind, apparently by some inherent force, and crashing through vast fields of ice, as if impatient to escape from the silence and desolation of the Polar seas. The explanation of this singular occurrence is, that powerful under-currents are acting upon the submerged portions, which, in all cases, vastly preponderate over the glittering precipices of crystal that appear above the water-line. As the icebergs advance into the open waters of the Atlantic, they at last come to the edge of the Gulf-stream, where, in "the great bend," about latitude 43°, they harbour in dangerous numbers, and without doubt send many a noble ship headlong to the bottom. In all probability the ill-fated *President* was thus destroyed, and some towering iceberg, that has long since bowed its glittering peaks to the solvent action of the warm water of the Gulf-stream,

was, perhaps, the only witness of the calamity which placed the noble *Pacific* among the list of ships that have sailed forth into eternity.

If the northern latitudes of the Atlantic have their dangers of ice, the southern latitude, especially the Caribbean Sea, in common with all intertropical oceans, have their dangers of fire. The hurricanes of those latitudes are generally accompanied by visitations of fearful thunder-storms, in which many a good ship is enveloped and destroyed. In the midst of a summer sea a clipper ship may be suddenly assailed by one of those tremendous conflicts of the elements, of the approach of which the silver finger of the barometer, unless carefully watched, has scarcely had time to give warning. However prepared by good seamanship and an active crew, there she must lie on the vexed ocean, her tall masts so many suction-tubes to draw down upon her the destructive fire from heaven. In his Report to the Admiralty, laid before Parliament in 1854, entitled "Shipwrecks by Lightning," Sir William Snow Harris—whose exertions to find a remedy for this evil are above all praise—states that in six years, between 1809 and 1815, forty sail of the line, twenty frigates, and ten sloops were so crippled by being struck as in many cases to be placed for a time *hors de combat*. In fifty years there were 280 instances of serious damage to ships in the British navy. Of these the *Thisbey* frigate, off Scilly, in January, 1786, affords a melancholy example. The log represents her "decks swept by lightning, people struck down in all directions, the sails and gear aloft in one great blaze, and the ship left a complete wreck." In the merchant service the list of disasters is fearful. Since the year 1820 thirty-three ships, varying from 300 to 1,000 tons, have been totally destroyed by lightning, and forty-five greatly damaged.

"A great peculiarity," says Sir William Snow Harris, "may be observed in cases of ships set on fire by lightning, viz. a rapid spreading of the fire in every part of the vessel, as if the electric agency had so permeated the mass as to render the extinction of the fire by artificial means impossible." Take, for instance, the burning of the *Sir Walter Scott* in June,

1855. This fine passenger ship, of 650 tons, was struck in the Bay of Biscay: the lightning shivered the foremast, completely raked the vessel, and instantly set fire to the cargo. The passengers and crew had scarcely time to jump from their beds and put on their clothes, and leap into the boats, when the masts went over the sides, the flames shot up into the air, and the ship went down like a stone. Such extraordinary catastrophes as these seem to set forth in unmistakable terms the feebleness of man in the presence of the tremendous powers of nature. In reality, they are only forcible instances to call upon him to use the means for dominating the peril. Of all the dangers that beset the mariner at sea, danger by lightning is the only one that he can thoroughly guard against. To Sir William Snow Harris we owe the perfecting of the lightning-conductor for marine purposes, and the power of braving unscathed the direst electric storms. The permanent conductor adopted in the navy in 1842 is arranged so as to extend along the masts, from the truck to the keelson, and so out to sea. In the hull various branches ramify, and admit of a free dispersion of the electric fluid in all directions. Thus armed, the ship is impregnable to all the forked lightnings that may dart about her. Since the system of fitting men of war with this apparatus has been adopted, no vessel of the Royal Navy has been injured. The log of the frigate *Shannon*, commanded by the late gallant Sir W. Peel on his voyage out to China, affords a striking example of the manner in which the fury of such electric storms as are only to be met with in the Indian Ocean, was baffled by a contrivance which may truly be called, in the words of Dibdin—

> "The sweet little cherub that sits up aloft,
> And takes care of the life of poor Jack."

"When the ship was about 90 miles south of Java she became enveloped in a terrific thunderstorm, and at 5 p.m. an immense ball of fire covered the maintopgallant-mast: at 5·15 the ship was struck a second time on the mainmast by apparently an immense mass of lightning; at half-past 5 another very heavy discharge fell upon the mainmast, and from this time until 6 p.m. the ship was completely enveloped in sharp forked lightning. On the next day her masts and rigging were carefully overhauled, but, thanks to Sir Snow Harris's system of permanent lightning-conductors, no injury whatever to ship or rigging was discovered."

If we compare this remarkable case with that of His Majesty's frigate *Lowestoffe*, when near the island of Minorco in 1796, we perceive how great is the protection science affords to the seaman. The frigate was struck, it appears, at 12·25 P.M. by a heavy flash, which knocked three men out of the tops, one of whom was killed on the spot. Within five minutes the ship was again struck, and her topmast was shivered to atoms. In another minute a third shock shivered the foremast and mainmast, and set fire to the vessel in many places, raked the deck from end to end, killed one man, paralyzed and burnt others, and knocked several persons out of the tops. In two parallel cases, the addition of a rod of copper made all the difference between safety and havoc. The example of the Royal Navy is being followed by the merchant-service, but not so speedily as it should be. When it is remembered that the treasure-clippers trading between Australia and this country often bring home nearly a million sterling in addition to a large complement of passengers, it does seem remarkable that the lightning apparatus is not considered as essential to their equipment as the boats, especially as they have to traverse an ocean where thunder-storms are of common occurrence. The cost of the whole apparatus is not above £100, and if the cupidity of the merchant is not sufficient to induce him to supply it, we think that Government should compel him, in order to insure the safety of the stream of passengers who annually leave our shores.

In the whole catalogue of disasters at sea, those which present the most terrible features are water-logged timber ships. The timber trade between Great Britain and her American colonies employs a very considerable fleet of large vessels. As wood is a "floating cargo," old worn-out West-Indiamen, which would not be used for any other purpose, are freely employed. A few years since, in addition to a full cargo, they carried heavy deck-loads, which so strained their shattered fabrics, that they often became water-logged, and were sometimes abandoned in the middle of the Atlantic. The sufferings of the crews on these occasions in their open boats were appalling.

Beating about for weeks on the waste of waters without food or drink beyond the rain that fell from heaven, they were obliged to sustain existence by preying on the bodies of their dead companions, and not rarely they cast lots for the living. Since the passing of the Act prohibiting deck-loading, these disasters are far less frequent; but they have by no means ceased.* At the time we write there are several timber-ships drifting about the ocean, floating heaps of desolation, at the mercy of the Gulf-stream, which will ultimately cast them on some European shore, or drift them into the North Sea, to serve as fuel for the Esquimaux. In turning over the leaves of Lloyd's List, we find indications of these dreary wrecks, which, clothed in seaweed, are driven over the face of the waters, and sighted by passing ships, of which they often cause the sudden destruction, whilst careering along in seeming security. When these waifs and strays of the deep drift into much-frequented ocean paths, they are doubtless the cause of many of those dreadful catastrophes witnessed only by the eye of God, and our only knowledge of which is a curt notice on the "Loss-book" at Lloyd's, "Foundered at Sea, date unknown." A recent instance, in which possibly no damage was done, will yet suffice to show the risk. The *Virago*, loaded with teak from Moulmein, in the Indian Ocean, to Queenstown, Ireland, became water-logged, and was abandoned on the 5th of March last, 155 miles south-west of Cape Clear. The next day she was passed by the American liner *Eagle;* on the 17th of the same month a steamer, on her way from Rotterdam to Gibraltar, reports having seen her; on the 5th of April she was passed by the *Naiad* on her passage from Palermo to Milford; and on the 15th the *Sumarang*, on her way to Tenby, met with her; on the 18th she was seen 160 miles off the Lizard, "in a very dangerous position," by the *Champion of the Seas;* again, on the 3rd of May, the *Alhambra* steamer, on her

* The effect of this Act, which passed in 1839, was most marked. In the three years previous, the average annual loss of timber ships was 56½, and the loss of life 300. In the three years subsequent to its coming into operation the loss of ships fell to 23½, and the loss of life to 106.

voyage to Southampton, met her in latitude 47°; about the same time and place she was seen by the *Peru* steamer, "and appeared as if run into;" and, finally, on the 20th of May, the telegraph sends word that she was stranded near Brest, and her cargo was being discharged. It is curious to note how, amid the tossing of the ocean, her name became gradually obliterated, till it was totally effaced, a type of the progressive decay and final destruction of the vessel herself. At first she is properly reported to Lloyd's as the *Virago;* the next ship makes her out to be the *Argo;* still later her cognomen is cut down to the *—go;* and then the name disappears until the French find her upon their strand. Here we suppose her half-obliterated papers were found, and our neighbours, according to their usual wont, transmute the *Virago* into the *Neroggogi.* From these reports it is evident that a number of large vessels passed quite close to the wreck, and it is even probable that a collision may actually have occurred, and no one have been left to tell the tale. In some cases, where the circumstances of wind and current are favourable, water-logged ships are taken in tow by other vessels and become valuable prizes. When, however, these wrecks are in such a condition that it is clear they cannot be brought in, we think it would be well if they could be destroyed. A few pounds of powder, judiciously placed, or a beam or two sawn across by the ship's carpenter, would break the bond that binds these logs together, and, once separated, they would not be likely to do much damage.

Many disastrous wrecks can be distinctly traced either to a defective compass, or to an ignorance of the effects upon it of the magnetism of the ship's iron. There is a melancholy example in the loss of H.M.S. *Apollo,* of thirty-six guns, in 1803, with forty sail of merchant ships, out of a convoy of sixty-nine vessels, bound for the West Indies. The *Apollo* was leading the way, with her train of outward-bound sugar ships following in her wake, little suspecting the catastrophe which was to follow. At the very moment her defective compasses drove her ashore, she imagined she was some forty miles off the coast at Portugal, and so close was the merchant fleet upon her, that upwards of

half of them took the ground and were dashed to pieces. More recently we have had the instances of the *Reliance* and *Conqueror*, wrecked near Ambleteuse, on the French coast, in sight of the cliffs of Albion, after voyaging from India. The former is known to have had an immense iron tank on board, the influence of which upon her compasses must have been very great. The *Birkenhead*, wrecked near the Cape of Good Hope, and the ship *Tayleur*, in the Irish Channel are additional instances of the destruction to which the trembling finger of the magnetic needle points the way, where ignorance or wilfulness have placed impediments to its truthful action.

Of the numerous errors that may be classed under the general term of compass defaults, we may mention defective compasses arising from imperfect workmanship, or from an ignorance of the principles of mechanical and magnetical science, compasses perfectly adjusted but placed injudiciously either with reference to the magnetism of the ship, or in immediate proximity to concealed and unsuspected portions of iron. Ignorance of the degree of compass error arising from the ship's magnetism, and of its varying amount in changes of geographic position, and a consequent belief, that in all places and under all circumstances the needle is true to the north, are frequent causes of shipwreck.

With regard to the defective mechanical construction of compasses, it must be admitted that great improvements have taken place of late years, and the chief credit, we believe, is due to the British Admiralty. Nearly twenty years ago they instituted a Committee of Inquiry, and the silent working of the measures then advocated, and the adoption of the improvements suggested first under the direction of the late Captain Johnston, and more recently under that of Mr. Frederick Evans, R.N., have infused into the manufacturers, and a large portion of the mercantile marine and shipowners, a degree of caution, skill, and attention to details, which has brought forth good fruit. A large portion of the superior compasses of the United States navy are manufactured in this country, entirely on the Admiralty pattern, and several foreign governments have

recently obtained the same instruments as models. It must not however be supposed that defective compasses have ceased to exist. Our coasting vessels and many of our noble sailing ships are miserably equipped, and there are many captains who still look on the compass as a cheap and common article, fit to be classed with hooks and thimbles and other articles of the boatswain's storeroom.

There can be no doubt that great errors in navigation are induced by inattention to placing the compasses. It is common to see the binnacle within two feet, and even less, of the massive iron-work of the rudder wheel, which again is in immediate contiguity with an iron sternpost. The local deviation is consequently great, magnet adjustment is had recourse to, and a temporary alleviation of the evil follows, which is only magnified on the ship approaching some distant port. Numerous examples are on record of iron being introduced by some addition to the equipment of the ship, which has perhaps been lost in consequence within a few hours after quitting port.

Among the causes which thus operate, we may name the fancy rails leading to state-cabins and saloons. These, beneath a highly-polished covering of brass, often conceal many hundredweights of iron. Cabin stoves and funnels, immediately under and alongside the compass, are frequently unsuspected. A noble transport, during the late war, carrying troops and stores, pursued her course by day with unswerving fidelity, but at night the compass was as wild as the waves themselves. After diligent search it was found that the brazier, in preparing the binnacle lamps, had introduced a concealed iron-wire hoop to strengthen their frame-work. The stowage of iron in cargo does not receive the attention it deserves, and we consider it should be imperative for every vessel which carries it to be swung for the local deviation before quitting port, and a certificate duly lodged before clearing the Customs. When the *Agamemnon* adjusted compasses preparatory to sailing upon the last unsuccessful expedition to lay the Atlantic cable, it was discovered that the presence of the enormous coil in her hold caused a deviation of no less than seventeen degrees! Had

she been a merchant ship, no similar verification would have been made, and the sign-post which showed the path upon the trackless waters would only have pointed to mislead.

It is remarkable how much misapprehension on the nature of magnetic action exists even among men of high intelligence. A competent witness, in a recent law-trial, in a case of wreck, arising chiefly from a want of knowledge of the laws of magnetism in the navigation of the ship, stated that seamen in general believed, that if a cargo of iron was covered over, its effects were cut off from the compass. A leading counsel in the case sympathized with the general ignorance, because he confessed that he shared it. The adjustment of compasses by magnets is a most delicate operation, and has received much attention from some of our leading men in science. An able committee, under the auspices of the Board of Trade, are now engaged, in the midst of an iron navy, in the port of Liverpool, in elucidating the whole of the subject. We feel bound, however, to record our opinion against the indiscriminate employment of all the nostrums prescribed by the compass-doctors or quacks at many of our seaports. Let the shipowner consult such reports of the Liverpool Committee as have been already published, or follow the Admiralty plan of having at least one good compass in a position free from all magnetic influences. In some of the large ocean steamers a standard compass is fitted high up in the mizen mast, and we hear that it is proposed to build a special stage on board the *Great Eastern*, in order to keep the compass from being affected by the immense body of iron in her fabric.

A perusal of the evidence given in those inquiries which take place relative to the loss of ships, under the Mercantile Marine Act, would lead to the supposition that defective charts were even a greater cause of wrecks than compass defaults; but this is not the case. The fact is, incorrect charts afford an excuse for a master who may have lost his ship, which is but too readily accepted by the members of courts of inquiry and of courts martial. The defence set up for the wreck of the *Great Britain* steamer, in Dundrum Bay, on the east coast of

Ireland, was, that St. John's Light, placed two or three years previously, was not inserted in the most recent charts of the Irish Channel procurable at Liverpool, and that consequently it was mistaken for the light at the Calf of Man. But these two lights are at least thirty miles apart, and it is monstrous to suppose that a steamer should be so much out of her reckoning within a few hours of leaving port. Again, in the more recent case of the wreck of the *Madrid* steamer, off Point Hombre, at the entrance of Vigo Bay, several masters were examined, who stated that they had invariably passed equally close to the same headland, in reliance on the correctness of the chart. "Under these circumstances," said the Court, "the loss of the *Madrid* cannot be attributed to the wrongful act or default of the captain." His certificate was therefore returned; and, at the same time, he was informed that, as a general rule, "150 yards is not a sufficiently wide berth to allow in passing headlands." We should think not; and furthermore we imagine that, if the omission of every insignificant rock close to shore, in government charts, is to be taken as an excuse for shaving a dangerous headland, we may expect to hear of many repetitions of the disaster. The *Orion*, wrecked on the west coast of Scotland, and the much-abused *Transit*, in the Banca Strait, owed their fate to the unseamanlike love of hugging the shore.

It must be admitted, however, that the charts in common use on board merchant ships are very faulty, both with respect to the position and character of lights, buoys, and beacons, and to the variation of the compass, which is not unfrequently half a point wrong,—an error which may be fatal in shaping a course up Channel or in a narrow sea. From this great evil the seaman has, at present, no protection. The remedy lies in the hands of the legislature, who have only to compel all chart-sellers to warrant their charts corrected up to the latest date, at least with respect to lights and buoys. There are but three or four publishers of private charts, as far as we are aware, in the United Kingdom; their stock of plates cannot be very large, and, once examined and set right, the corrections and

additions could be easily inserted. Either the Board of Trade or the Admiralty should be entrusted with this duty. The latter are obliged to correct their own charts, and we understand it is the practice of the hydrographer to cause every new light, or change of light, or buoy, or beacon, to be inserted in the plate within twenty-four hours of the time of the intelligence reaching the Admiralty. A large number of notices to mariners—upwards, we believe, of a thousand a-week—are printed and published, both by the Trinity House and the Admiralty, and distributed among those connected with shipping; and every chart-seller should be bound under a penalty to give proof to the Board of Trade or to the Admiralty that he had inserted the corrections in his copper-plate within forty-eight hours of the appearance of the notice.

It is a startling fact that the materials for constructing charts, even of parts of the waters which wash the shores of Europe, are not yet in existence. Of the coast of Europe generally we are tolerably well informed, although there are many portions that require closer examination; but on the African and Asiatic portions of the Mediterranean, the early seat of civilization and the best known sea in the world, there is still much to be done. When M. de Lesseps brought forward his romantic proposal for a Suez Canal, no survey existed of the coast of Egypt from Alexandria to El Arish. Of Syria we know nothing accurately; Cyprus, Rhodes, and the western half of Crete, are still almost blanks. But it is in the eastern seas and in the Asiatic Archipelago that we are most at fault. The Persian Gulf, portions of the coast of India, Ceylon, Burmah, Malacca, Cochin China, the Yellow Sea, Corea, Japan, the southern and eastern parts of Borneo, Celebes, &c., are hardly so correctly mapped as the mountains in the moon. The north and east coasts of New Guinea, again, are unsurveyed. As long as the Spice Islands, and the unknown lands washed by the Indian seas, were given up to pirates, and to the imagination of poets, this want was not felt; but now that our clippers swarm in these seas, and that Australia herself is beginning to trade there extensively, we shall assuredly hear of fearful shipwrecks

from want of surveys. Then, indeed, it will be truly said, that imperfect charts are the cause of shipwrecks, unless, when India passes under the Imperial Government, vigorous steps are taken to remedy this grievous defect.

Closely connected with the question of imperfect charts, is the state of the lights, buoys, and beacons around the coast—those fixed and floating sentinels set around the island to guide and direct the weather-beaten mariner. A few years ago we should have had to bewail our shortcomings in the number of these aids to navigation, and have had to point to them as prominent causes of shipwreck. The report of the Select Committee of the House of Commons on Lighthouses, in 1845, shows the want that then existed, not only on the coasts of Scotland and Ireland, but even at the entrance of the River Thames. Much, however, has recently been done. It appears, from the address of the Prince Consort, at the annual Trinity House dinner, that 77 lighthouses, 32 floating light-vessels, and 420 buoys and beacons, under charge of the corporation, are now distributed around the coasts of England alone. Great praise is due to the elder brethren of the Trinity House for their care in lighting the Prince's Channel, and especially for their admirable works now in course of construction under Mr. James Walker, C.E.; among which we may instance the new lighthouses at the Needles, at Whitby, and at St. Ives, the light-tower on the Bishop Rock, off Scilly, and on the Smalls off Pembroke. In Scotland, also, several new lights have been established; and some of the buoys have been coloured on a systematic plan—red buoys being placed on the starboard hand, and black buoys on the port hand, on entering a harbour from seaward, according to the mode adopted in France, Belgium, and Holland. This system, however, presents difficulties where there are several channels, as at the mouth of the Thames; but there are many places in which it might be applied with advantage. At present, we believe, the river Tees is buoyed on exactly the reverse plan; and in some of the large ports of the kingdom a local scheme is adopted, which completely closes the navigation to all but the local pilots, for whose special advantage

this secret system appears to be maintained. The adversaries of a simple and uniform method of buoying the coast do, indeed, urge that it would put the key of our harbours into the hands of our enemies; but this argument is so puerile that it is hardly worth notice. If we cannot maintain the integrity of our waters by force, we certainly shall never maintain it by cunning.

The want of lights on the shores of Ireland has long been a cause of complaint. Till within a few years, on a coast which is the land-fall of nearly all vessels that cross the Atlantic from Canada, Nova Scotia, Boston, and New York, there were spaces of sixty, seventy, and eighty miles without a light! Yet during all this time light dues were levied on the Americans, and other nations, who were thus treated to a sample of Irish reciprocity. On the coasts of the United States there were ample lights and no light dues, while on the coast of Ireland the lights were few and the dues heavy. We trust that the royal commission which, on the motion of Lord Clarence Paget, has lately made its report respecting the state of the lights and buoys of the country, will give a stimulus to the improvement which has already begun, and either get rid of these light dues or recommend a more equitable method of levying them. One penny a ton on the actual tonnage of the country, paid once a year, would be sufficient to maintain all the lights in the kingdom, and would be more simple than the present complicated system of paying every fresh voyage, which bears so unjustly on the coasting trade. The time, we believe, is close at hand when the lights themselves will be revolutionized. It is of the last importance to the mariner that the brightest and best light that science can furnish shall be held out upon the sunken rock, or perpetually maintained upon the dangerous headland. Yet it cannot be denied that we have nothing better than oil lamps for the purpose; and though the most profound science and the most delicate art have been employed to make the most of this feeble power, the fact remains, that we have not advanced beyond the oil-wick of the last century in our attempts to provide a light which will throw its beams far and wide over the

sea, and pierce through the fogs and drifting snow-storms of the dark winter nights. It is not less strange that we are behind the French, and even the Spaniards, with respect to the mechanism necessary to concentrate the little light we have. In the two former countries the vast majority of the lighthouses are upon the dioptric principle, the whole light of the lamps being concentrated in occasional flashes, by means of a powerful system of lenses, forming a complete cage of glass. England, on the contrary, employs in most of her lighthouses the old metal reflectors; and, as Lord Clarence Paget justly observes, the voyager leaving Folkstone will clearly appreciate the difference between the two systems, by comparing the dioptric light flashing from the far distant Cape Griz Nez with the feeble spark of the English reflector light close to him at Dungeness. It has been the great aim of the constructors of these powerful lenses to throw all the light of the lamps into parallel rays, so that only a thin disc of light is cast upon the sea; but, as Mr. Findlay truly remarked in his paper read at the Society of Arts, we have at last over-refined, and a fearful shipwreck has already been the result. The *Dunbar*, after making a prosperous voyage to our antipodes, was wrecked at the Sydney headland, within sight of her port. This dangerous cliff was surmounted by a reflector light which sent a thin disc of rays, under which the ship passed in a fog. Had a few divergent rays been allowed to light the danger at her feet, she would have escaped her fate.

Another great and increasing difficulty arising from the limited capabilities of the present burners, is the fact that steamers are beginning to show lights as powerful as those exhibited in lighthouses of the inferior order and in the light ships. Hence a confusion is growing up between the fixed and the moving lights, which threatens to produce most disastrous consequences. As recently as February last, the *Leander*, an American barque, proceeding down St. George's Channel, saw a light which she mistook for that on the Tuskar Rock, and, when too late, discovered that it belonged to the screw steamer *North America*, which was coming right ahead. A fearful

collision was the consequence, and the unfortunate ship with nearly all her crew was sent to the bottom. It has been found absolutely necessary to change the light in the Nore light-ship from a fixed to a revolving one, to distinguish it from the numerous powerful lights carried by steamers at anchor or when passing along the Thames.

Various attempts have been made to increase the illuminating power of the burners. In 1832 Lieutenant Drummond proposed the use of the oxy-hydrous light, and as far as the intensity of light was concerned the new agent was perfectly successful, the Drummond light at seventy miles' distance appearing nearer to the spectator than the ordinary reflector light at twelve miles. But it was found impossible to maintain a steady light by this system, and it was therefore abandoned. Since then Professor Holmes has been making experiments with the magnetic electric light. The apparatus is said to consist of a series of very powerful magnets, around the poles of which the helices are made to revolve by means of a steam-engine. A powerful magnetic current is thus produced, which passing through carbon pencils shows a splendid light. The great difficulty of this and of other similar propositions to obtain the light by passing the current through two points, is to so regulate them that they shall always remain at the same distance apart, for any variation would immediately affect the intensity of the light. This desideratum has not yet been accomplished, neither do we think it possible of accomplishment. Professor Way has, however, we imagine, solved the problem by substituting a running stream of mercury in place of these points.

A moment's inspection of the grim wreck chart leads us to reflect whether the care taken to warn mariners of their danger is not in many cases the immediate cause of their seeking it. If we note, for instance, the lighthouses fringing St. George's and the English Channel, we are struck with the extraordinary fact that there we find the greatest congregation of those dismal dots which indicate loss of life and property, and it would seem as though ships like moths were attracted

and destroyed by the light. Such, no doubt, is often the case. Ships bound up Channel make for the nearest light, and from that shape their course until they meet with the next light. They feel their way, as it were, in the dark night by the hand-rail of these guides, and sometimes stumble on the very rocks that support the beacons themselves—the fog, as in the case of the *Dunbar*, allowing them to get within and under the danger flash. The disasters produced by this system of groping about sunken rocks and bluff headlands has led Mr. Thomas Herbert of the Trinity House to propose the lighting of the Mid Channel. His system is to moor floating lighthouses, of a form which secures a steadiness sufficient for the purpose, and he is thus enabled to place a row of most powerful lights at little comparative expense up the very centres of the two great channels of English commerce, and indeed of the commerce of the world. A ship on entering the Channel would immediately make for the westernmost of this line of "Fair-way lights," instead of looking out for the Lizard, and once having made it, the course would be free of all possible danger. Eight floating light towers extending from the westernmost one, forty miles south-west of Scilly, to Dungeness, would add enormously to the security of this wreck-strewn sea. The outermost of these lights Mr. Herbert proposes should be put in telegraphic communication with the shore, by which means merchants and consignees would be made acquainted with the arrival of vessels full a day earlier than at present. By this means also Greenwich time could be laid on to the station, and enable the anxious captain to verify the correctness of his chronometer up to the latest possible moment. Such a station might further serve as a depôt for water and fresh provisions, so much required by vessels detained by contrary winds in the Chops of the Channel, and to provide which ships are now annually sent out by the Admiralty. Without expressing any decided opinion upon this scheme, it seems to us to possess sufficient plausibility to warrant inquiry. If there should be no insurmountable practical objection,—and we have heard practical men speak well of it,—there can be little doubt that

it would dissipate in no small degree the dangers of the Channel, without interfering with the present lights, which would always be useful for the coasting trade.

Perhaps the most frequent cause of wreck, especially on our own coast, is negligence on the part of the master. If we analyze the cases of collision that occurred in the year 1857, we are surprised to find that by far the larger portion of them occur in the open sea, and in clear bright weather. Out of 277 collisions, involving total and partial loss, bad look-out was the cause of 88, and neglect of the rule of the road of 33 collisions. It is a saying among sailors that if the three L's are attended to—Lead, Latitude, and Look-out,—a ship is safe; and no more apt saying could have been uttered. Simple as the casting of the lead is, it is almost invariably found, when the causes of wreck are inquired into, that this precaution has been neglected. The *Ava* mail-steamer was undoubtedly lost off Trincomalee, in February last, owing to this omission. The lead is not only capable of telling the soundings, which alone would warn the mariner of the approach of shoal water; but, when armed, it is capable of bringing a voice from the deep to say on what coast the ship may be. Had the masters of either the *Reliance* or *Conqueror* cast the lead, they would not only have known that their vessel were getting into shallow water, but that they were upon the French coast; for the lead brings up a coarser sand from the shores of our neighbours than from the opposite coast on the English side. The question of latitude is a question which tests the nautical knowledge of the captain. A man who can take celestial observations correctly is not very likely to be deficient in a knowledge of navigation. The differences between masters of ships in this respect are very marked. Captain Basil Hall tells us, in his "Fragments of Voyages and Travels," that on a voyage from California to Rio, the first land he saw was on either side of him, upon the clearing off of a fog at the entrance of Rio de Janeiro. With no other guide than science he had hit his port without sighting land, after a voyage of many thousand miles. With this we may contrast a case given in the Report on

Shipwrecks for 1836, in which the brig *Henry*, of Cork, bound to St. John's, New Brunswick, with seventy passengers on board, was fallen in with by the *Andromeda*, of New York, in a starving condition; her master, by his own reckoning, being 800 miles to the westward of his true position. This man must have been one of those who, as the sailors say, "come in at the cabin windows, instead of working his way up through the hawse-holes." Errors of this kind are not likely to occur so often as formerly, thanks to the working of the Mercantile Marine Act, which will, we think, prevent the recurrence of the grosser mistakes in navigation. No greater blessing was ever conferred on the merchant shipping of this country than a law which compels the holding an inquiry by competent persons in all cases of casualty. It is abused, as any measure is sure to be that rigidly sets its face against misconduct; but it has already done infinite good, and would do still more if its provisions were strictly enforced.

It is often supposed that the shifting of sandbanks is a cause of wreck, but there does not seem sufficient ground for this opinion. We have heard many marvellous stories relative to the shifting of the Goodwin, and of the sudden exposure in full preservation of the hulls of long lost ships. These tales are all poetical, though the edge of the bank may here and there give way and expose the ribs of some vessel long since sucked in. What change there is in the Goodwin, and it is of a very gradual nature, takes place on the western or inshore side: its eastern side is as steep as a wall, and retains the position it had when the first exact survey of it was made. The Brake Sand in the Downs off Ramsgate seems to have moved bodily inshore or to the westward, and there is a slight disposition to change in sands known by the names of the Leigh Middle and Yantlet Ground in Sea Reach, at the entrance of the river Thames. The Yarmouth and Lowestoff sands shift slightly. A channel, or gat as it is called, opens now in one place and now at another; but these variations are soon known and buoyed by the Trinity House. Changes take place at the entrance of the Mersey, but the surveyor of the river quickly

marks the deviations and makes them known to the pilots. On the north-east coast of England more extensive alterations have taken place; a large portion of Holderness, in Yorkshire, has been washed away, and the sea has broken through Spurn Point, threatening to make it once more an island. At Landguard Point, at the entrance of Harwich harbour, the injudicious removal of a barrier of cement stone, by which the heavy stroke of the sea has been allowed free action on the shore, has caused the sand to be heaped up within the last half-century, until a shingle beach now rears its head seven feet above the level of high water; where, not many years since, a line-of-battle ship could have sailed into the harbour. Another remarkable increase of land is at Dungeness, where the shingle has extended at the average rate of three yards a year, since the beginning of the Christian era. But although of vast importance to the engineer in dealing with harbours, these changes are not productive of shipwreck.

The principal cause of shipwreck on the shores of the United Kingdom is undoubtedly the want of harbours of refuge. From the parliamentary returns it appears that the tonnage of vessels which entered and cleared from the ports of this country in 1857 amounted to 23,178,782 tons, or in round numbers 232,000 vessels. Even this falls short of the number of vessels that are constantly passing and repassing along our coasts, and which, on the springing up of a sudden gale, are liable to wreck, inasmuch as it only gives those which are carrying cargo. It does not include colliers and other vessels in ballast, nor ships of war, nor small coasters laden with stone, lime, &c., all of which would swell the amount to full 300,000 vessels.

We have already stated that the number of casualties to shipping on the coasts and within the seas of the United Kingdom has averaged 1,025 a year; that the loss of life has amounted to 830 a year, and that the destruction of property reaches a million and a half. It is not an uncommon occurrence for a single gale to strew the coasts with wrecks. In the three separate gales which occurred in the years 1821, 1824, and 1829, there were lost on the east coast of England, in the short

space between the Humber and the Tees, 160 vessels. In the single gale of the 31st of August, 1833, 61 vessels were lost on the sands in the North Sea and on the east coast of England. In the tremendous gale of the 13th of January, 1843, as many as 103 vessels were wrecked off the coasts of the British Isles, and among them 13 large ships off the port of Liverpool alone. In the gale of 1846, 39 vessels got ashore in Hartlepool; and in the month of March, 1850, 134 vessels were stranded or came into collision. In the gale of the 25th of September, 1851, as many as 117 vessels were wrecked; and for each of the four first months of the year 1858 the Board of Trade returns show that there has been from 140 to 150 casualties, or from four to five a day. These facts are sufficient to prove the appalling loss of life and of property, and the absolute necessity which exists for establishing on the most exposed and frequented positions of our coasts that shelter which the sailor has a right to expect in the time of need.

Formerly in the reports of the shipwreck committees so many vague generalities were dwelt upon, that the House of Commons had no definite conclusions upon which to proceed. This is no longer the case. In the evidence laid before the select committee of the House, when inquiring into refuge harbours, in the year 1858, it is shown that there are certain districts in which wreck is the normal state. Nearly one-third of all the casualties take place on the east coast of Great Britain, and in 1857 it was more than one-half! Nay, it is all but demonstrated that the larger part of these occur within some seventy miles of coast, or between Flamborough Head and the Tyne. Here, then, the subject is narrowed to a point. The immediate vicinity of the coal ports must be the site of a harbour of refuge—some spot which all colliers, light and loaded, pass, whether it be in the bight of the bay (or the bag of the net), as Tees Bay, or whether it be farther to the southward, near Filey Bay. The exact locality may require careful consideration; but the question of situation on the east coast of England is now narrowed to a distance of fifty miles. One unexpected fact has come to light in the course of this investigation, namely,

that of the colliers lost on this part of the coast, the proportion of loaded vessels to light is as 5 to 1.

On the coast of Scotland there is a sad want of deep-water harbours of refuge. From the Pentland Frith southward to Cromarty, a distance of 100 miles, there are none but tidal harbours, all inaccessible for twelve hours out of the twenty-four. It is the same from the Moray Frith round by Peterhead to the Frith of Forth, with the exception of the Tay. Yet it is along this coast that a great part of our Baltic trade, and all the Greenland, Archangel, Davis Strait, and much of the Canadian and United States trade must pass. In addition to this traffic, both of these coast districts are remarkable as the great scene of the herring fishery. Peterhead has its 250 fishing-boats, Fraserburgh and Buckie more than 400 sail; while farther north, off the coast of Caithness, more than 1,200 fishing-boats, manned by 6,000 men, nightly pursue their calling, exposed to the proverbial suddenness of a North-sea gale. Here then, in some portion of this district, either at Peterhead, Frazerburgh, or Wick, a refuge harbour is imperatively required.

On the west coast of England, between the Land's End and the south coast of Wales, including the Bristol Channel, shelter is absolutely needed. The trade of the Irish Sea, including Liverpool, Glasgow, and Belfast, and the great and increasing traffic of the coal ports of Newport, Cardiff, and Swansea, in addition to the trade of Bristol and Gloucester, urgently call for some refuge. For the former probably a harbour near the entrance of the Channel, as at St. Ives, would be the most useful; for the trade of the upper portion of the Bristol Channel, Clovelly on the south coast, Lundy Island in the centre, and Swansea Bay on the north, have been the sites particularly recommended in the evidence. On the coasts of Ireland, the rocks named the Skerries, near Portrush, on the north coast, Lough Carlingford on the east, and Waterford on the south, have been mentioned as places where good harbours may be obtained at but a trifling outlay.

It appears from good evidence that the existing tidal har-

bours around our coasts are susceptible of great improvements for the purposes of joining harbours of refuge in case of need. We think this supplementary view of the question one of much importance. It is shown that the small sum of 2,500*l.* a year, which the Scottish Fishery Board is empowered to grant annually, to meet double the amount raised from private sources, has been of much value, and has given rise to many piers and fishery harbours on the coasts of Scotland. A somewhat similar measure applied to harbours generally would be of the utmost value. There are many in which the loan of a small sum of money, at a low rate of interest, would confer a great benefit. The enormous parliamentary and other fees attendant on getting a Harbour Act are so ruinous, that many of the lesser harbours are kept in a state of decay from the impossibility of raising funds to restore them. We are glad to see that Mr. Henry Paull, M.P. for St. Ives, has given notice in the House of a bill to remedy this evil, and to enable some public department, such as the Admiralty and Board of Trade, to grant the necessary powers for raising funds to execute *bonâ fide* improvements. We cordially wish him success, and trust that he will persevere until his proposal has become the law of the land.

It would naturally be imagined that the wrecks and collisions that occur on our own coasts formed only an insignificant portion of the casualties that take place throughout the world. But this is not so. The trade of the world is drawn towards our shores, and these shores are washed by narrow and therefore dangerous seas. Hence we can account for a fact which would otherwise appear astounding, that the losses on our own coasts form nearly a third of the losses throughout the world. According to the returns of Lloyd's agents, the average annual number of casualties and of vessels that have touched the ground within the last four years in all seas is 3,254; whilst, as we have already stated, those that occur upon our coast average 1,025. Long as the list of home disasters is, it is at least satisfactory to find that the more severe cases are not increasing. The official record of these casualties does not

extend back farther than the year 1852, but the annual returns since that date, which we append, are on the whole encouraging.

	1852.	1853.	1854.	1855.	1856.	1857.
Wrecks . .	958	759	893	894	837	866
Collisions .	57	73	94	247	316	277
TOTAL .	1015	832	987	1141	1153	1143

From this Table it will be seen that while there is an absolute decrease with respect to wrecks, which is due, no doubt, to the greater intelligence of the masters and the working of the Mercantile Marine Act, a large and increasing number of collisions has happened. The latter circumstance is important, and in all probability is attributable to two causes, the vast addition that has taken place of late years to the trade of the country, and the manner in which steam is supplanting the use of sails. If we cast back our glance only fifteen years, and compare the trade of that period with what it is at present, we are astonished at the rate at which our commerce has advanced. We find it stated in the statistical abstract of the year 1858, that the amount of British shipping which entered and cleared from the ports of the United Kingdom in 1843 was 7,181,179 tons, and of foreign 2,643,383 tons, making together an aggregate tonnage of 9,824,562 tons. In 1857, however, the tonnage of British shipping entered and cleared had increased to 13,694,107, and the foreign shipping to 9,484,685 tons, making an aggregate quantity of no less than 23,178.792 tons ; thus showing an increase of 13,354,230 tons, or 136 per cent., in fourteen years! With this prodigious addition to the ships passing our shores, we have reason to be thankful that wrecks are not of far more frequent occurrence, and it will account for the otherwise alarming multiplication of the number of collisions. And not only are there more ships, but a greater proportion of them are propelled by steam. A

parliamentary paper, not long since published, shows that the number of steamers employed in the Home and Foreign trade has increased from 414 in 1849 to 899 in 1857; that is, the number of vessels most prone to come into collision has more than doubled within the last eight years, and while the sailing vessels have increased during this period only 3·49 per cent., the latter have increased 117·15 per cent., the proportion of steamers to sailing vessels having advanced from 2·22 per cent. in 1849 to 4·87 per cent. in 1857. Bearing in mind the speed at which steamers go, and the manner in which their powerful lights, just introduced, simulate those of lighthouses and light-ships, the increase of collisions is not surprising. There can be no doubt that the introduction of coloured side-lights, which all vessels, both sailing and steamers, must henceforward exhibit, will enable the direction in which another ship is standing to be distinguished, which was not the case heretofore.

The most important object after the prevention of ship-wreck is that of rescuing the crew when the catastrophe takes place. All along the coast—grouped thicker together where the fatal black dots indicate dangerous spots—we find rude marks indicative of the presence of life-boats. Thus, whenever the dangerous headland or the hidden shoal threatens destruction to the mariner, the means of preservation are close at hand. Of these boats, each manned by a fearless crew of twelve volunteers, there are 141 stationed along the coast; seventy being under the management of the National Life-Boat Institution, and seventy-one under the direction of various corporations and local authorities. To the princely conduct of the Duke of Northumberland, the President of the National Life-Boat Institution, we owe the present improved condition of the means of saving life in cases of shipwreck. As far back as the year 1790, two humble boatbuilders on the banks of the Tyne, Greathead and Wouldhave (who were encouraged and fostered by the then Duke of Northumberland), invented the broad, curved form of life-boat, with air-cases, which was chiefly in use around our coasts. This model was afterwards much departed from, and by degrees the most imperfect boats

(provided they were lined with what were supposed to be air-tight cases) were dignified with the name of life-boats. The many casualties that happened to these craft, which were built by rule of thumb rather than upon any scientific system, brought them into much disrepute. Too often, indeed, their hardy crews, instead of fulfilling their mission, were drowned on the way. In some instances, owing to their defective build, they turned *end over end* when struck by a heavy sea, and, from want of the power to right themselves when capsized, the unfortunate men were encaged beneath them. To prevent the recurrence of such disastrous accidents, the Duke of Northumberland offered a premium for the production of a model life-boat, and the result was the exhibition of several respectable contrivances. Not one of them, however, fulfilled all the prescribed conditions; nor was it until after several trials and many experiments that the present life-boat was completed. It appears to be the production of a committee and not of an individual; but the chief credit of it is due to Mr. Peake, of the Royal Dockyard, Woolwich; to Joseph Prowse, junior, foreman of the same yard; and to Messrs. Forrestt, the well-known boat-builders of Limehouse. It has been adopted by the Life-Boat Institution, and has stood the test of some years' experience without a single failure. In a trial lately made at Boulogne, the boat was twice purposely capsized by the help of a crane, and righted herself in two seconds, and in less than fifteen seconds the water with which she was filled disappeared through her self-acting valves. Of the entire number of 1668 seamen saved during the last year, 399 owed their lives to these boats, and we have no doubt that in future years they will prove still more effective, if only well handled and not rashly sailed by inexperienced men; for no life-boat can be devised that will not be liable to accidents if entrusted to careless or unskilful hands.

But there is another point almost equally important that seems to have been greatly overlooked, the worthlessness of the so-called life-boats that every emigrant ship, every transport, every passenger vessel, is by Act of Parliament required to

carry. We have no hesitation in pronouncing them to be in most cases a mockery, a delusion, and a snare. It is not long since that we heard from the lips of one of the most extensive boat-builders on the banks of the Thames, that, when a boat was condemned as unseaworthy for any other purpose, it was a common practice to patch it up, add a certain amount of air-case, and dispose of it as a life-boat. We know not with whom it rests to see the Act enforced, whether with the Board of Trade or the Life-boat Association, but the fact of its evasion is notorious, and a heavy responsibility rests somewhere. Even when the crazy thing is embarked, it is often so stowed that it cannot be lowered in case of need without long delay, and is frequently deficient in sails, oars, thole-pins, plugs, and always without an efficient compass. Yet in this ill-equipped boat the lives of thirty, forty, perhaps fifty, of our too confiding countrymen are risked. It would be easy to see, before the vessel sailed, that the life-boat was efficient; that a certain supply of provisions and fresh water was placed in proper cases; that the mast, sails, oars, and thole-pins were secured into the boat, and that an efficient boat-compass was provided, instead of the ridiculous toy that goes by that name, the card of which spins round like a top at every stroke of the oars. The beautiful spirit or liquid boat-compass of Dent may be purchased for less than £5. A life-boat thus furnished would give confidence to the passengers, would serve them well in time of need, and would be no more than the legislature is entitled to require under the provisions of the Act. Anything less is a gross imposition upon the simple emigrants, who embark in confidence, believing that everything has been done for their safety.

In addition to the life-boat system we have located in most of the coast-guard stations rocket and mortar apparatus to enable a connection to be established with stranded vessels by firing a rope over them. This method was effectual in 243 cases during the last year, and is well worked under the auspices of the Board of Trade. The drawback to the use of the mortar apparatus is its weight, which prevents its being easily transported along the rocky shores where it is chiefly needed, but we

understand that Mr. Brown, of the General Register and Record Office of Seamen, has invented a portable apparatus, which will in all probability greatly facilitate our means of communicating with stranded vessels, and tend in no small measure to still further lessen the dismal list of seamen who annually perish on our weather-beaten coast.

LODGING, FOOD, AND DRESS OF SOLDIERS.

If the question had been asked a short time since what body of men presented the most healthy lives in her Majesty's dominions, the reply might reasonably have been Her Majesty's Foot-Guards. Recruited, at the age of nineteen, principally from among the agricultural population, submitted to the critical examination of the inspecting surgeon, tried in wind and limb and tested at every point, the would-be soldier must be proved an athlete, or renounce for ever the hope of wearing her Majesty's uniform. Absorbed into the picked corps of the army; quartered either in metropolitan barracks or within a stone's-throw of the palace of the Sovereign; clothed, fed, housed, and tended in sickness by the State; and only in the face of great emergencies required to brave the dangers of foreign service; the weak and incapable instantly weeded out from the ranks,—his does indeed seem to be a select life, with which no other among the labouring classes would appear to be comparable. As we see him on parade in all the pomp and panoply of war, we view him with pride as worthy of that noble band that swept irresistibly before it the eagles of France, and, single-handed, at Inkermann, long kept the foe at bay, and saved two armies from destruction. Yet take the unhealthiest trades in England—the pallid tailor, as he sits at his board, or the miner who lives in the bowels of the earth—and it will be found that the percentage of deaths in their ranks is not nearly so great as in those of the magnificent Guards, pipeclayed and polished up to meet the eye of princes, but, alas! often little better than whited sepulchres. Such is the fact elicited by the labours of

the Commissioners appointed to inquire into the regulations affecting the sanitary condition of the army. If the "most favoured" regiments furnish these disastrous results, it may be imagined that the condition of the rank and file, who take their turn in all climates, must be much worse; but, strange to say, the contrary is the fact. This is shown in the following table, which gives the number per thousand who die every year among the army at home and among the male civilians of England and Wales at army ages :—

Household cavalry	11·0
Dragoon Guards and Dragoons	13·3
Foot Guards	20·4
Infantry of the line	18·7

Population of England and Wales, at army ages :—

Town and country population	9·2
Country alone	7·7

One of the unhealthiest towns at army ages :—

Manchester	12·4

According to Mr. Neison's calculation, the mortality of the Household Cavalry is $1\frac{4}{5}$, Dragoons, &c., $2\frac{1}{5}$, Line $2\frac{9}{10}$, and Guards $3\frac{1}{15}$ times as great as the mortality of the agricultural labourers who are members of friendly societies. Well may the Commissioners, contemplating these returns, remark—

"That in war men should die from exposure, from fatigue, from insufficient supplies, is intelligible; or that the occupation of a town of 30,000 inhabitants by an army of 30,000 men, without any sanitary precaution, suddenly doubling the population to the area, and thereby halving the proportion of every accommodation, supplies, water, drainage, sewerage, &c. &c., should engender disease, is readily understood; but the problem submitted to us is to find the causes of a mortality more than double that of civil life among 60,000 men, scattered, in numbers seldom exceeding a thousand in one place, among a population of 28,000,000, in time of profound peace, in a country which is not only the healthiest, but which possesses the greatest facility of communication and the greatest abundance of supply in Europe."

In endeavouring to solve this extraordinary problem, the first question naturally asked is, Why the foot soldiers suffer a rate of mortality so much higher than the cavalry? They are re-

cruited pretty much from the same source, and breathe apparently pretty much the same atmosphere; yet we find that the Foot Guards perish at nearly double the rate of the Life Guards. The causes of this difference are mainly, overcrowding and the want of due exercise and employment. The chief diseases of the soldier are fever and consumption; the latter, or "the English Death," as it is but too aptly termed, being the chief destroyer. The deaths by pulmonary disease amount in the cavalry to 7·3 per thousand, in the infantry of the line to 10·2, and in the Guards to 13·8; whilst of the entire number of deaths from all causes in the army, diseases of the lungs constitute in the cavalry 53·9 per cent., in the infantry of the line 57·277 per cent., and in the Foot Guards 67·683 per cent. We are strongly inclined to believe that some portion of this extraordinary mortality from pulmonary disease may be owing to the atmosphere of pipeclay in which the Foot Guards, and indeed the Horse Guards in a minor degree, live. In 1853, the year in which the mortality tables were made up, the former pipe-clayed their white trousers and fatigue jackets as well as their belts. Thus the fine dust must have been for ever entering their lungs, and Mr. Simon, in his recent Report affecting the health of special occupations, expressly states that the workers in potteries are among the most unhealthy artisans, in consequence of the clay-dust they are constantly inhaling in the course of their daily work affecting their respiratory organs.

It would appear that overcrowding is the chief cause of the disparity of the death-rate between the two classes of Guards. If we compare the extremes, we find that, whilst the Foot Guards quartered in Portman-street barracks have only 331 cubic feet of air allotted to each man, the Horse Guards at the Hyde Park barracks have 572 cubic feet; and if we take the whole force of Foot and Horse Guards, we find that in London the latter have the advantage of between one-fourth and one-fifth more air in their barracks. But there is another and very important difference in favour of the Horse Guard: his exercise is on the whole more varied than that of the Foot Guard. In

the infantry, the drill only exercises the lower limbs and fixes the chest in one position; the grooming of a horse brings nearly every muscle into play, which tends to open and expand the chest. The broadsword exercise has the like effect. This diversity in the daily duties and in the amount of air they have to breathe, explains, we believe, the great discrepancy between the deaths from consumption of the two classes of Guards.

The reason for the increased mortality of the Dragoon regiments over that of the Life Guards is not so easy to discover. As regards the Line regiments, being quartered mostly in country localities, they breathe on the whole a better atmosphere and have more exercise than the Foot Guards. That this is the reason of their lower rate of mortality would appear from the fact, that while the Guards were campaigning in Canada during the rebellion, enjoying the same pure air as the Line, and undergoing precisely the same fatigue and exposure, their relative rate of mortality was reversed, and the Foot Guards proved the more healthy of the two. The latter portion of the Crimean campaign showed the same result.

When the high rate of mortality was first made known in the "Times," military authorities imputed it chiefly to the destructive nature of the night duties. The evidence given before the Commissioners, however, entirely negatives this explanation.

There are three classes of men whose night duties are more severe than those of the Foot Guards—firemen, the police, and sailors; yet, strange to say, all three enjoy a high state of health. The London fireman undergoes, perhaps, more wear and tear than the rest. His duties call him sometimes to several fires in a night, and when not out he is waiting in readiness. Whilst on service he is liable to great varieties of temperature, and to a good deal of wet; one minute he is scorching in the midst of the fire, the next half-drowned by the water. Nevertheless, he suffers a mortality of only seven per thousand. The metropolitan police are on duty ten consecutive hours in all weather, yet their mortality is less than nine per thousand. The comparison between them and the Foot

Guards is the closest that could be made, as the unmarried men all live in section-houses (or barracks), are clothed in a uniform, and fed in messes. Yet the mortality is just half that of the line regiments, and less than half the mortality of the Foot Guards! The sailor on the home station, who is worse lodged than either, and is subject to constant nightwork of a very exposed character, shows a still more favourable result. It is clear therefore that the nightwork will not account for the frightful inroads made by disease in the ranks of the soldier. Nor need we go much further than the barracks to know the main causes of all this suffering and death. In London, as we have said, no more than 331 cubic feet of air was meted out to her Majesty's Foot Guards, and in Dover Castle it was reduced to 147 feet per man, or less than the quantity which brought about the jail fever which Howard discovered to be raging in the Cambridge Town Bridewell in 1774. The highest average space allotted to each man before 1847 was 447 cubic feet. Even this amount of air is rendered less pure by defective arrangements. Add to which the beds are placed only one foot apart, in defiance of the fact that a man may be suffocated in a crowd notwithstanding that he has all the sky above him. The state of the morning atmosphere is thus summed up by Serjeant Brown, in answer to the questions from one of the Commissioners:—

"Have you often gone into the men's rooms in the morning before the windows were open?—Yes. In what state did you find the atmosphere?—In a very thick and nasty state, especially if I came in out of the air. If I went in out of my own room sometimes, I could not bear it till I had ordered the windows to be opened to make a draught. I have often retired to the passage and called to the orderly man to open the windows."

In some cases the troops are lodged in the basement of buildings below the natural level of the soil, or in places where the storekeepers object to put their stores, in consequence of the damage that would result to them from the damp. A notable instance is given in evidence by Dr. T. E. Balfour:—

"In 1845 the armoury was burnt down in the Tower, and a new barrack was erected on its site—certainly not before it was wanted, because the

accommodation was very bad. The barrack was finished in the beginning of 1849; fever was then prevailing among the men, and cholera threatening. The surgeon applied to have the new barracks given over for the use of the men, and he got two rooms; he remonstrated through his commanding officer with the authorities, when he was informed that he could not have more given over to him, as they were full of stores—blankets, I believe. On suggesting that the stores might be put into the old barracks, he was told that they were a great deal too damp to put stores into, and it was only in consequence of an energetic remonstrance on the part of the commanding officer, which I believe reached the Duke of Wellington, that a Board of officers was ordered to assemble, who recommended that the troops should be immediately moved into the new barracks."

Now and then the crotchet of a Colonel does a vast deal of mischief. Not many years since, the cavalry at Knightsbridge were condemned to drink the water from the Serpentine,—a reservoir of filth, which is now pronounced to be pestilential to the neighbourhood. The men objected to use this diluted sewage; but the commanding-officer had perfect faith in filters. Nevertheless, the water persisted in smelling bad, notwithstanding it looked clear,—a mystery the Colonel's knowledge of chemistry could not fathom; nor would he give in until a Board had been called. The veterinary surgeon now began to complain that the coats of the horses were beginning to stare, and he wished that they should drink from the improved supply which was furnished to the men. The Colonel still had faith in his Serpentine water, and maintained that the horses would prefer it to the purer stream. A bucket of each was placed side by side in the barrack-yard, and a horse was brought in, which immediately settled the question by refusing the dirty water, and plunging its muzzle into the clean. It is not many years since the troops stationed at the Tower were, in like manner, forced to drink the Thames water, taken from the most convenient, which chanced to be the foulest, spot in the whole river. A coarse filter did not suffice to protect them from the disease such supplies were sure to engender.

They manage these things better now in civil life. In the year 1848, the Society for Improving the Condition of the Working Classes opened their first model lodging-house. Their measure of the quantity of air necessary for the poor man was much greater than that settled three years later, by the mili-

tary authorities, for the soldier. The mechanic and labourer were allowed 542 cubic feet; the soldier, under the most favourable conditions, breathed no more than from 400 to 500 cubic feet,—a measure which fines off, by degrees, to the Black Hole allowance at Dover Castle, where the soldier was reduced to 131 cubic inches. Nor is this the only point in favour of the model lodging-house, of which there are several situated in the foulest portions of the metropolis, and which accommodate sometimes seven hundred inmates, or the full strength of many a regiment. Besides containing pure air, which, with a proper system of ventilation, costs nothing, but is of incalculable value to human life, the lodging-house, instead of being confined to one room, used for all purposes, is divided into the ordinary apartments of an inn; every inmate has his own dormitory, and there is a good coffee-room stored with papers and books, and supplied with hot water. In the kitchen below, there are facilities for roasting, boiling, baking, and frying, and each man has his safe for provisions. Hot and cold baths are provided; and the whole building is heated by hot-water pipes, and well lighted by gas. If the soldier was treated like his brother of the chisel and the hammer, the mortality of the Guards would not be at the rate of 20·4, and that of the ordinary rank and file at the rate of 17·8 per thousand, whilst that of the mechanic is only 13·9 per thousand.

If we were to write volumes, we could not deepen the impression these figures are calculated to convey of the importance to health of sanitary science. It has been said that soldiers would not appreciate the benefits of a model lodging-house, and that, as the colonel asserted of the troop-horse, they prefer the dirty to the clean,—crowding in a common room, to separate apartments. If this were true, it would be no reason for not teaching them better. If bad habits are congenial to them, they do not suffer less when the mischief is done; and if they were callous to the last, the interest of the nation still requires that lives which cost so much should not be recklessly thrown away. But experience refutes the supposition that soldiers have different notions of comfort from civilians. The

Guards, in the old part of the Wellington Barracks, had, on one occasion, the temporary use, as a day-room, of an apartment fifty feet by thirty, and, large as it was, it became inconveniently crowded. The Commissioners, in their report, recommend that a minimum space of 600 feet be allotted to each man in his barrack and guard-room, that an interval of at least three feet be maintained between each bed, and that a day-room should be provided. The barrack should at least be on a par with the workhouse.

The high rate of mortality in the army is not to be attributed to the bad arrangements of barracks alone; the important elements of exercise and food have to be considered, and in both the infantry are in an inferior position to the artisan.

"Perhaps," says Colonel Lindsay, "no living individual suffers more than the soldier from *ennui*. He has no employment save the drill and its duties; these are of a most monotonous and uninteresting description, so much so that you cannot increase their amount without wearying and disgusting him. All he has to do is under restraint; he is not like a working man or an artisan; a working man will dig, and his mind is his own; an artisan is interested in the work on which he is engaged: but a soldier has to give you all his attention, and he has nothing to show for the work done. He gets up at six; there is no drill before breakfast; he makes up his bed and cleans up his things: he gets his breakfast at seven; he turns out for drill at half-past seven or eight; his drill may last half an hour. If it be guard-day there is no drill except for defaulters. The men for duty are paraded at ten o'clock; that finishes his day-drill altogether. There is evening parade, which takes half an hour, and then his time is his own until tattoo, which is at nine in winter and ten in summer. That is the day of a soldier not on guard or not belonging to a company which is out for Minié practice."

Unless it be denied that the mind has any influence over the body, it cannot be doubted that the inaction to which the infantry soldier is subjected in barracks, by the regulations of the service, is most detrimental to his mental activity and bodily health. The actuary well knows that the affluent upper classes, although in every other respect placed in the best sanitary condition, are shorter lived than the agricultural labourer, for the simple reason that, having but little active duty to perform, they suffer from *ennui*, which begets dissipation. The soldier shares with the wealthy this cause of increased mor-

tality, without sharing in their other favourable conditions. Idle and ill-lodged, he naturally resorts to the public-house, and, having but little money to procure drink, he too often degrades himself by sponging upon the female admirers of red coats for the means. The annals of the police-courts are but too rife with the records of crimes and misdemeanours committed by the Foot-Guards from these causes. Mr. Jeffreys, a high authority, testifies that in India a large proportion of the men chafe and drink themselves to death, under modes of life so opposed to the habits of out-door labour in which they have been reared. The soldier is not so much in fault as the rule of the service which precludes him from making himself useful. The best-conducted troops are the Engineers, who work at their different trades. The evil does not stop with the mischief which the idle are sure to perpetrate. The active, self-reliant Englishman is notoriously the most dependant soldier in Europe. He can neither cook, bake, make his clothes, nor hut himself, like the Frenchman, the Sardinian, or even the Turk. Contractors follow him everywhere, excepting into the presence of the enemy; and when he most needs every necessary of life he finds himself a helpless man. Mr. J. R. Martin, one of the Commissioners, who has passed a life in high posts as a military surgeon in India, and who has done more for the sanitary condition of the soldier than any living person, holds it as a principle, "that in all climates the soldier should do for himself whatever he can perform without injury to his health, morals, or discipline; and, further, that he should be required to do whatever may be essential to his serviceable condition, in the event of a failure of the appointed appliances. Before the soldier can be held as fit to undertake his duties to the State, he must be made capable of maintaining everything which may be necessary to his personal care and comfort." Does Aldershott or Shorncliffe fulfil even the majority of the conditions calculated to train the soldier for active service? Is he taught to build his own hut, to dig his own well, to make his own roads, to cook his own victuals, or to mend his own clothes? Aldershott, in fact, is not a camp at all, but a city

of soldiers, built and maintained "by contract;" the sum expended on the buildings alone, for the years 1854 to 1856, being no less than 486,502*l.* 13s. 6d.; and we have little doubt that up to the present time, the civil labour has cost more than 600,000*l.** Now, as Colonel Tulloch urged, before these barracks were erected, why should not the men hut themselves? There are clay, gravel, and sand, on the spot, with abundance of small wood that no one will buy, not more than eight miles distant. Soldiers have hutted themselves at Maroon Town, in the West Indies, at 25*l.* per head. The buildings would not be such permanent structures as the contractors have put together: we should miss the architectural façades for the officers' quarters, and the "moulded cornices" so maliciously described by the *Times'* correspondent; but we should have serviceable huts which would last for eight or ten years. There can be little doubt that the men would be healthier in them than in vast barracks. The process of building would supply the kind of exercise which would amuse as well as instruct, and the plan would certainly save money to the State. Considerably more than one half, or 647·9 per thousand, of our soldiers have been recruited from the agricultural population, to whom the erection of earthworks and building of all kinds would be somewhat familiar. Of the remaining number, 294·7 have been trained to mechanical trades. Surely, from this force handicraftsmen could be selected to perform much of the work of the army. Bakers, cooks, tailors, and bootmakers, could be found to supply the wants of the regiment, and relieve us from the incubus of government contractors. We place more confidence in a system in which the artisan-soldier will reap the fruits of his labour, than in athletic games, which are not to be neglected, but which become irksome when they are enjoined upon the soldier by regulation. Serious exertion, too, with a useful result, is always more invigorating in the

* Whilst the civil workman is called in to do the work of the soldier at home, strangely enough we send out the soldier to do the work of the emigrant abroad. A force of Royal Engineers some time since left these shores for the purpose of discharging this office in British Columbia.

long run than exertion which leaves no result at all. Work, in short, within reasonable limits, is more healthful than play.

During the disastrous months of the Crimean campaign, Mr. Galton proposed to give a series of lectures to the reinforcements about to proceed to the seat of war, on the shifts available in wild countries. He went to the Museum of the United Service Club at the hour he had advertised, but as his audience amounted to but one soldier, he discontinued his efforts to make known those *wrinkles* he had acquired with so much suffering himself. The substance of these intended lectures he has since amplified into a book, which is one of the most interesting little volumes we ever read, and which should be in the hands of every campaigner, whether military or otherwise. Had our soldiers been acquainted with its contents when our commissariat broke down, they would have been able to lighten their miseries in a considerable degree. The services which he extracts from a single piece of stick are almost inconceivable; and when there seems to be no further hope, he shows how the difficulties may often be overcome by the aid of the very circumstances which appeared to have caused the breakdown. His makeshifts and expedients are, it is true, at times rather rough; and Ensign Firebrass, as he looks at his neatly-polished little boot, would perhaps be startled at being told, that on a march, "pieces of linen a foot square, smeared with grease, and nicely folded over the foot cornerwise," form a capital substitute for socks; or that breaking "a raw egg into a hard boot before putting it on greatly softens the leather." Such announcements may be horrifying in the midst of luxury, but in hard circumstances the most nicely got up London dandy would be grateful for the hint. Many a poor soldier, at any rate, would be glad to know that even on a plain where there is nothing except the turf beneath his feet, protection is at hand if he were aware how to avail himself of it. "He need only turn up a broad sod seven feet long by two wide, and if he succeeds in propping it up on its edge, it will form a sufficient shield against the wind," and even against a drifting rain, provided he plants his turf between the weather and himself.

As regards the in-door amusements of the soldier, we have but little belief in regimental libraries. The recruit from the agricultural districts will not read such volumes as generally form the bulk of these collections. A Scotch sergeant or two will thumb over Rollin's "Ancient History," or Robertson's "History of Scotland," but the majority of the soldiers will not look at them. "I have never heard of a reading army," said the late Dr. William Fergusson; and we agree with him as far as what are called standard works are concerned. The soldier can be amused, however, with a lighter class of literature, and there is a certainty of pleasing him with a newspaper. This is the reading he selects for himself in the public-house, and why not condescend to consult his tastes? Major-General Lawrance stated that the system had been tried in some garrisons with excellent effect, of providing a room where the men could procure papers, coffee, and a pipe. "We approach the soldier," says Robert Jackson, "with the dram-bottle in one hand, and the lash in the other." Things are not so bad as in his day, but the temptation and the punishment are still provided; and to reduce both as much as possible, we should employ pleasant preventives, both of a moral and physical kind.

The question of food is intimately connected with the health of the soldier, and, as far as we can see, no attempt has been made by the commissariat to adjust it satisfactorily to the varying conditions to which he is subjected. The truck system, which has long been abolished by law in the payment of workmen, is still maintained to some extent in the army. The soldier is nominally paid 13*d.* per day, but out of this the authorities stop a certain sum, which varies with the markets, for the rations and other necessaries supplied to him. The quantity of the ration is fixed both for service at home and abroad. At home he has 1 lb. of bread and $\frac{3}{4}$ lb. of meat inclusive of bone, an additional $\frac{1}{2}$ lb. of bread being given to troops encamped in England. Abroad the ration consists of 1 lb. of bread or $\frac{3}{4}$ lb. of biscuit, and 1 lb. of meat either salt or fresh, the additional $\frac{1}{4}$ lb. being given to compensate for the

inferior quality of foreign compared to English meat. There are one or two exceptional rations; but at home or abroad, in peace or in war, the ration (the quality of the meat being considered) is the same. Simplicity may be urged in favour of the system, but we fear this is its only merit, and we are not at all surprised to find the following remarks in the Report :— "We are of opinion that no ration can be fixed upon which shall be adhered to in both peace and war. The conditions of life are so different in the two cases, that whatever is suitable for the one must be either too much or too little for the other." Common sense would clearly point out that the ration which would be amply sufficient for the soldier in country quarters, whose principal occupation is lounging along the street, or leaning upon a bridge, would go but little way to maintain the wear and tear of a man when exhausted by the fatigues of an active campaign. The degree and nature of his labours then may be gathered from the following extract from the Report of the Commissioners of Inquiry into the Supplies of the Army in the East :—

"The average weight carried by a soldier on the march, including food and water for the day, is probably not less than from fifty to sixty pounds, and while carrying that burden he is frequently required not only to march considerable distances, but also to move rapidly, and make other great exertions. In the ordinary course of his duty he is called upon to watch during the night at longer or shorter intervals, whatever may have been his previous exertions. He is exposed to every vicissitude of temperature, and often to the inclemency of the weather, by night as well as by day, and must be ready to turn out when required, at any hour, and under any circumstances. He must generally be content with the shelter of a tent, whatever the climate may be. When engaged in siege operations, he has to perform, mostly during the night, the work that a railway labourer performs by day—excavating and removing earth. When stores are to be landed, he is often required to do the work of a dockyard labourer. When employed in active service the soldier, therefore, requires a diet as nourishing as that which is requisite to maintain the physical powers of any other man engaged in hard labour involving frequent watching and exposure."

That is, the soldier is required at times to be a railway navvy, and something more; but, unlike the navvy, he is not allowed to replenish his inward man according to his natural desires, but according to a certain fixed regulation. As well may a stoker limit his engine to a hundredweight of coals a day, and

expect to get any speed out of it he pleased. The navigator, whilst executing heavy work, is known to eat as much as six pounds of meat a day. Now we question if any navigator ever worked harder than the common soldier in the trenches before Sebastopol, yet he was expected to perform his task on one pound of meat, fresh or *salt*, equal to three-quarters of a pound of English beef or mutton. The salt meat too is vastly less nutritive than fresh ; and in case the lemon-juice fails, as it did in the Crimea, scurvy and its allied diseases are sure to follow its use. Well may Dr. Christison have remarked "that any scientific person conversant with the present subject (dietaries) could have foretold, as a certain consequence, sooner or later, of their duty, that the British troops would fall into the calamitous state which befell them in the Crimea." It must be evident again that the soldier during a Canadian winter requires more meat than he does between the tropics. In cold climates the nitrogenous and carboniferous food should predominate ; in warm climates a larger amount of vegetable food is required. The exact amount of the different kinds of food, however, requires a special study ; but surely chemistry, which has so admirably catered for the varying wants of prisoners undergoing fluctuating amounts of exertion, could find no difficulty in furnishing proper dietary tables for the British army in different parts of the globe. The Commissioners, in their Report, fully convinced of the injustice even at home of keeping stalwart English soldiers upon half a pound of meat per day, recommend that it shall be increased to a pound.

In the clothing of the British soldier a contest has been long going on between what is considered by the officers to look "smart," and what is found by the men to be comfortable. A soldier upon parade and a soldier going into action scarcely looks the same man. The tight coat, the stiff stock, and the ugly shako, give a stiffness to his figure which is termed "a soldierly appearance :" but upon the march or the eve of battle the jacket is thrown open, the trowsers are tucked up, the shako is thrown away, and the stock follows suit. He has divested himself of every particle of clothing which is supposed

to conduce to his smartness; but he is a free man: he can use his limbs with facility, he can march without fainting, and he can fight at his ease. Major-General Lawrance, apologising for the retention of the shako, and for the leathern stock, upon home service, urges that "it is essential to consider the appearance as well as the comfort of the soldier." Some of the soldiers themselves wish to keep the stock, provided "that it may always be taken off when muscular exertion is required." The Commissioners are of opinion, and we think rightly, that "this condition applied to any part of a soldier's dress is condemnatory of it." Why should he possess a set of fine weather feathers any more than the fireman or the policeman? Fitness is the very essence of comeliness. The Ironsides of Cromwell would have smiled grimly at the holiday suit of the modern soldier. The Commissioners in their Report condemn nearly every article of clothing in present use—the stock as an instrument of strangulation; the shako as neither fitted by size, colour, weight, material, nor form, for service in hot climates; and the trowsers as gathering dust on the march. In the Crimea the men were in the habit of wrapping a piece of bale canvas from the commissariat stores round their legs, which effectually protected them from the mud and wet. This suggests a return to the old gaiter used in the army during the early part of George III.'s reign, and still by some regiments of Highlanders, or the adoption of a boot to lace over the bottom of the trowsers like the ordinary shooting boot. The West India regiments are ordered to wear the Zouave dress—the loose trowsers, leather leggings, jacket, and fez. This may be well enough adapted for black troops, but we should be sorry to see our own men tricked out in this foreign fashion.

The chief parts of the soldier's body which require attention, as regards health, are the head and neck. The head should be protected against the extremes of heat and cold by every means that science can devise. In tropical climates we still retain the shako, shielding it from the sun with a linen cover. The insufficiency of this device is read in the fearful mortality from sun-stroke, which devastates our army in India at the present

time. The natives wear a cotton turban with an old horseshoe on the top to protect them from sword-cuts; and the Commissioners recommend a light cap covered with wadded linen, with a flap hanging down behind. Like the sola or pith helmet, the protection here is in the slow conducting power of the material. Mr. Jeffreys, however, in his admirable treatise entitled "The British Army in India," justly remarks, that the slower a substance conducts, the longer it retains its heat. A turban-covered shako worn all day in an Indian sun becomes charged with caloric to such an extent that it will give out a sensible heat when hung up in the tent, and will distress the head the moment it is put on; for this reason the covering should be placed outside the tent at night to cool. But, after all, though the heat may penetrate very slowly to the wearer, the time comes when at last it reaches the skull. The protection may be ample for the acclimatised Hindoo, and yet be insufficient for the European. Mr. Jeffreys tells us that the scarf-skin of the Indian is so much thicker than that of the European, that, when serving as a medical officer, he was obliged to have a lancet ground in a peculiar manner for vaccinating the horny hide of the native infants. We therefore agree with him that science must be called upon to give the English soldier a still further defence against the sun. He has himself attempted to solve the problem. Instead of the use of the cloth-covered helmets he terms sun-traps he has constructed an ingenious covering in which reflection, retarded conduction, slow radiation, convection, and ventilation are brought consecutively into play. There can be little doubt that scientifically his contrivance is unexceptionable, and would keep the head always cool. The weight, however, which his plan necessitates is a material element, although it is the heat not the weight which kills. If we desire to form an idea of the amount of heat which is thrown off by a bright surface, we have only to place our hands before the polished sides of a common firegrate, when the reflected heat will be found to be very little less than that directly radiated from the fire. It is just because these sides cast the heat which strikes them back again that the inner face

is kept comparatively cool. This, therefore, is the best description of surface to present to the sky. It may be objected that the soldiers would be dazzled by the helmets of their comrades; but the inconvenience would only be incident to a curvilinear-shaped helmet, possessing numerous tangential planes of reflection. A rectangular form, such as that of the present shako, would reflect the rays of the midday sun either down to the earth or up to the sky, and there would be no more glare observable than from the windows of a house, which, except at sunset, are the darkest part of the building. The helmet of the crusader was made in the form of a tin pot: this was retained by the Knights Templars, who well understood the value of the bright reflecting surface and the rectangular shape.

Mr. Jeffreys goes further. He proposes that the body-dress of soldiers serving in tropical climates should also have a metallic reflecting surface. Though the idea may seem strange, we think it worthy of consideration. A good defence against tropical heat must be devised if we intend to keep India; for we cannot afford to send English regiments to be wholly destroyed as fighting men every ten years. The sun is the great ally of the natives; they counted upon its service in the late rebellion, and we must endeavour to convert this enemy into a friend. A perfectly sun-proof dress would be worth many armies to us. Some regiments of irregular horse, which are by far the most picturesque-looking troops we have, wear a light gray woollen blouse with simple curb chains on the shoulders to protect them from sword-cuts. This we believe to be the most suitable garment at present in use. Mr. Galton says that "during the progress of expeditions notes have been made of the number in them of those who have provided themselves with flannel, and of those who have not, and the list of sick always included names from the latter list in a very great proportion." With a host of such facts, well known to all who have paid attention to the subject, it seems surprising that the military authorities should have adopted a linen blouse for the troops in India. This material is perhaps the best conductor of all the fabrics used in dress; its unsuitableness therefore for a climate which is

alternately hot, cold, and wet, may easily be imagined. The neck and spine should be guarded against the assaults of the sun almost as carefully as the head. In all ages Easterns have been mindful to protect the great nervous highway. The Arabs invariably bring one of the ends of the turban down over the neck, and the French have adopted the same plan in Algeria. As regards the spine, every one has experienced the sense of sickness which is produced when the back is brought close to a strong fire. Such a fire the poor soldier often endures for hours when marching under an Indian sun. Sun-strokes arise as much from this cause as from the exposure of the head. The Arab has a long tasselled loop of cloth hanging down in the small of the back, which acts as a piece of solar armour: the English soldier should have a similar protection, unless we are to consider that his black knapsack and his neatly rolled great-coat are all that is required. A belt of flannel should by no means be forgotten. The direct rays of the sun striking upon the expanse of nerves over the abdomen often bring on cholera or dysentery. The soldier should have, in addition, a loose woollen wrapper to serve as a change when campaigning. The value of dry clothes when he lies down on the bare ground after a fatiguing march is not to be overrated. "The skin's debility is malaria's opportunity," justly remarks Mr. Jeffreys. "The germs of fever, dysentery, and cholera, stalking over the bodies of a sleeping army, which has been exposed to the sun by day, quickly scent out the enfeebled skins and divide the prey!"

The colour of the dress is important. Dr. Coulier, who has lately investigated the qualities of different materials as clothing for troops, found that white cotton placed over a cloth dress produced a fall of 7 degrees per cent. in heat. When the tube of a thermometer was covered with cotton sheeting and placed in the sun, it marked 35·1, with cotton lining 35·5, with unbleached linen 39·6, with dark blue cloth 42, with red cloth 42. From these experiments it will be seen that the staring red of our uniforms absorbs no less than seven degrees more of heat than simple cotton. As we have to guard against the cold of night, and the damp of the rainy season, perhaps the best

method of meeting the varied conditions of heat, moisture, and cold would be to give the soldier a simple woollen blouse of some neutral colour, which, while it did not absorb the sun's rays, would yet be pleasing to the eye. Gray, faced with red, or girdled with a red sash or belt, would have an excellent effect, and would answer admirably.

It is singular that whilst our troops at home, for the last twenty years within the immediate influence of a growing sanitary science, have profited little by its teaching, the troops quartered abroad within the same time have experienced a marked decline in their annual rate of mortality. In the year 1835 Lord Howick caused a parliamentary inquiry to be made into the causes of the fearful mortality among the troops on some of the foreign stations, especially in the West Indian islands. The returns proved even worse than had been anticipated. The mortality in Jamaica was no less than 128 per thousand, or, in other words, every eighth man who stepped on board a transport for service in this beautiful island was doomed to leave his body for the land crabs. In the other islands the mortality was somewhat less, the deaths being 81 in the thousand. The reason of this decimation had long been known. More than fifty years ago Robert Jackson had pointed out the deadly nature of our military posts, situated for the most part at the embouchures of rivers and in low harbours, or placed in the immediate neighbourhood of pestiferous swamps. Salt pork and rum were called in to finish the work malaria had commenced. Five days a-week were our soldiers rationed upon this poisonous food; and, to make the injustice more glaring, the convicts upon the island were fed with fresh meat, and were consequently in good health. In 1843 Sir Charles Metcalfe determined that the troops should no longer perish. He altered their diet and removed them entirely from the marshy plains to Maroon Town, which stands at an elevation of not more than 2,500 feet on the Blue Mountains, but sufficient to lift European life above the level of the deadly fevers of the climate. The effect of these changes exactly corresponded with what had been foretold by Jackson; the mortality speedily fell

from 128 to 60 per thousand, and is now reduced to 32. Thus for many generations the mortality of white troops in Jamaica was fourfold what it should have been, through ignorance and extravagance; for, strange to say, the difference between the cost of the poisonous salt pork and the healthy fresh meat caused a saving to the Government of 80,000*l.* a-year.

In other colonies the improvement in the health of the troops has been marked of late years. At Ceylon, where resort has been had to hill-stations, the mortality has decreased from 74 per thousand,—at which ratio it stood until 1836,—to 38 per thousand at the present time. During the same period, we find that at St. Helena the rate has fallen from 25 to 12, at Gibraltar from 22 to 12, at the Ionian islands from 27 to 17, and at Newfoundland from 37 to 11 per thousand. From this gratifying statement we must except the greatest dependency of all,—our Indian Empire. In Bengal the mortality of the British soldier, just before the mutiny, was even greater than it had been twenty years before. On the average of nineteen years previous to 1836, it had been 75 per thousand; on the average of the next period of eighteen years, it was 76 per thousand. In Bombay, the mortality has decreased 2 per thousand; but in Madras the improvement has been such that the deaths have fallen from 76 to 41 per thousand. Whilst India remained in the hands of the East India Company, and the British troops stationed there seldom exceeded 25,000, the high mortality of the presidency of Bengal might have escaped observation; but now that the European soldiers are more than doubled, the necessity for putting their sanitary condition upon a proper footing must be obvious. "Colonel Tulloch has informed me," says Mr. Martin, in his admirable work on the Influence of Tropical Climates on the European Constitution, "that between 1815 and 1855 there died, of European soldiers belonging to her Majesty's and the East India Company's army in India, very nearly 100,000 men, the greater portion of whose lives might have been saved, had better localities been selected for military occupation in that country." Estimating

the value of each soldier in India at 100*l.*, this would give a sum of 10,000,000*l.*

The barracks and cantonments of India, as regard vastness and solidity, are, perhaps, not to be equalled by any in the world. The military buildings of Burhampore, in Bengal, are said to have cost, during the seventy-seven years they were in existence, including capital and interest, 16,891,206*l.*; yet this costly station, like that of Secunderabad, in the Madras presidency, was planted in an absolutely pestiferous locality. All over India the localities of the barracks are bad, and their construction and arrangement extremely faulty. "Nearly the whole station of Cawnpore," says Mr. Jeffreys, "running some miles along the river, was so cut up into small 'compounds,' by high mud walls, that a bird's-eye view would have given it the appearance of a divided honey-comb. These walls, with the profusion of trees they enclosed, seemed as if designed to cut off every current of wind from the inhabitants of the ground-floor dwellings hidden within them." In another case, as if to make stagnation doubly secure, he mentions that there is a square wall within a square wall, surrounding a cantonment. Hence we can easily account for the fearful mortality among European troops in India. As if to make patent to us the folly we commit in constructing these vast bakehouses, the native troops, who hut themselves outside our lines, and thus get plenty of air, present the unique example of a soldiery whose mortality is below that of the population from which it is recruited. In the Bengal presidency the mutiny has cleared away the difficulty; for it has swept the mass of these pestilential cantonments from the face of the earth. The question, how shall we profit by the loss? is answered by Mr. Martin in his "Suggestions for promoting the Health and Efficiency of the British Troops serving in the East Indies." He insists that we must station our troops, in future, upon the hills, but not on such stations as we have on the Himalaya and Neilgherry mountains,—positions of 7,000 feet above the sea; for, although they are a security against the fevers of the country, they are apt to induce bowel complaints, which are almost as

fatal. His opinion is, that elevations of from 2,800 to 6,000 feet would yield a climate most congenial for European troops, —such, in fact, as we have already found in the Blue Mountains of Jamaica. He especially draws attention to the solitary hills,—"those islands of the plains,"—as capable of affording a refuge from the fevers that inundate the low-lying ground. Here the mass of the British army may be lodged until their services are needed. From these eyries, like the Romans of old, they may watch the champaign country, and be ready, at a moment's notice, to move on any threatened position. There is no intention of recommending the abandonment of strategical points, or large cities which serve as arsenals, simply because they are not wholesome. There are dangers to be braved in peace as well as in war. Yet our experience of the heroic qualities of the British soldier justifies the assumption that small bodies of them, placed in strongly fortified positions, could hold out against all comers until succour should arrive from the hill-stations, especially now India is being traversed by railroads and telegraphs. But even these stations are not sufficient to restore patients suffering under chronic disease. These, if possible, should at once be sent home. The sick officer is invalided, and speedily recovers in the air of his native land; the common soldier, on the contrary, is forced to enter the hospital,—too often to die. The men, moreover, should be recruited for a shorter time. At present they practically serve seventeen years in India,—a period which breaks down the constitutions of the majority. It is the exposure to heat for a great length of time, and not its intensity for a short period, that destroys European life. If we entrap the ignorant labourer by the most unworthy artifices,* we should, at least, be merciful to him. Let the term of service be reduced to ten years, and then the stream of stalwart Britons, fresh from the mother-country, would enable us, in conjunction with hill-stations, to keep a powerful and resistless grasp upon the country.

* Mr. Jeffreys informs us that he saw during the mutiny a recruiting sergeant's placard in which there was an engraving of a British trooper cutting down a Sepoy and taking from him a bag of treasure.

It may well be imagined that, if the sanitary condition of our army is so bad in times of peace, its sufferings in war must be greatly exaggerated. The experience of the Peninsula, Walcheren, Burmah, and Sebastopol, has unfailingly proved this to be the case, and, in manifold instances, the evils were such as could have been avoided with ease.

"The barracks and the military hospital," says Miss Nightingale, "exist at home and in the colonies as tests of our sanitary condition in peace; and the histories of the Peninsular war, of Walcheren, and of the late Crimean expedition, exist as tests of our sanitary condition in the state of war. We have much more information on the sanitary history of the Crimean campaign than we have of any other. It is a complete example—history does not afford its equal—of an army, after a great disaster arising from its neglects, having been brought into the highest state of health and efficiency. It is the whole experiment on a colossal scale. In all other examples the last step has been wanting to complete the solution of the problem. We had in the first seven months of the Crimean campaign a mortality among the troops at the rate of 60 per cent. per annum from disease alone—a rate of mortality which exceeds that of the great plague in the population of London, and a higher ratio than the mortality in cholera to the attacks; that is to say, that there died out of the army of the Crimea an annual rate greater than ordinarily die in time of pestilence out of sick. We had during the last six months of the war a mortality among our *sick* not much more than among our *healthy* Guards at home, and a mortality among our troops in the last five months *two-thirds only of what it is among our troops at home.*"

This splendid testimony to the value of sanitary science, exhibited on the largest scale, on an apparently hopeless field, is without appeal. The Commissioners propose a medical officer of health for the army,* second in rank to the principal medical officer, and attached to the quartermaster-general in the field. This officer, says the Report, should be the head of the sanitary police of the army, should be answerable for all the measures to be adopted for the prevention of disease, and should report to the quartermaster-general, and to the principal medical officer. In order to prevent any evasion of responsibility, they further recommend that the sanitary officer shall give his advice in writing, and that the disregard of it on

* This idea of a sanitary officer for armies in the field originated with Mr. J. Ranald Martin, who has long advocated the measure in his correspondence with the medical journals, and with the East India Government. To this gentleman we also owe the suggestion of a health officer in civil life.

strategical grounds shall be equally recorded by the officer in command. Having thus provided for the army in the field, the Commissioners propose that there shall be associated with the Medical Director-General of the Army a sanitary, statistical, and medical colleague. Each of these officers would be at the head of a distinct department—the sanitary officer taking cognizance of all questions of food, dress, diet, exercise, and lodging for the soldier; the statistical department gathering together those invaluable details relative to the health of the army, for the want of which the British troops have so long suffered a mortality out of all proportion to the civil community; while the medical department would serve as a connecting link between civil and military medicine, keeping the latter up to the last word of science, as spoken by the great medical authorities in all countries. Some of these suggestions will require deep consideration before they are adopted. Nothing, at any rate, must be permitted to fetter the absolute power of the commander in the field, who must have a real as well as a nominal freedom. But every precaution which can guard the health of the soldier without cramping the discretion of the general is demanded alike by humanity and policy. What was so powerfully said in the last century has remained in a great degree true in our own. "The life of a modern soldier is ill-represented by heroic fiction. War has means of destruction more formidable than the cannon and the sword. Of the thousands and ten thousands that perished in our late contests with France and Spain, a very small part ever felt the stroke of an enemy; the rest languished in tents and ships, amidst damps and putrefaction; pale, torpid, spiritless and helpless; gasping and groaning unpitied among men, made obdurate by long continuance of hopeless misery; and were at last whelmed in pits or heaved into the ocean, without notice or remembrance. By incommodious encampments and unwholesome stations, where courage is useless and enterprise impracticable, fleets are silently dispeopled, and armies sluggishly melted away."

THE ELECTRIC TELEGRAPH.

If a needle turning upon a pivot were fixed at York, and if, by a wire placed in close proximity to it, the needle could be made to move to the right or to the left through the agency of a power applied at the other end of the wire in London, and if it were agreed that one motion of the needle to the left should signify *a*, and one to the right *b*, &c.,* we should have just such a contrivance as the common needle telegraph now in use.

Such is the dry statement of a problem the more detailed working of which we are about to explain to the reader.

When a schoolboy places a sixpence and a piece of zinc in juxta-position with each other in his mouth, he immediately

* Code of letter signals in the needle telegraph commonly used in England. Two needles are generally employed, in order to facilitate the transmission of signals:—

Let *a* denote a deflection of the *left-hand needle to the left, a' to the right; b* a deflection of the *right-hand needle to the left, b' to the right.* Then here is the code:

+	*a*	H	*b*	R	*a b*
A	*a a*	I	*b b*	S	*a a b b*
B	*a a a*	K	*b b b*	T	*a a a b b b*
C	*a' a*	L	*b' b*	U	*a' a b' b*
D	*a a'*	M	*b b'*	W	*a' b'*
E	*a'*	N	*b'*	X	*a' a' b' b'*
F	*a' a'*	O	*b' b'*	Y	*a' a' a' b' b' b'*
G	*a' a' a'*	P	*b' b' b'*		

Thus F is indicated by two successive deflections of the left-hand needle to the right; R by a simultaneous deflection of both needles to the left. Where both needles are required they may be and are deflected simultaneously; where one only is used its deflections must of necessity be successive. The sign + means "I do not understand;" the letter E "I do understand."

perceives a singular taste, which as instantly disappears upon their separation; it is an experiment which most of us have performed, wondered at for a moment, and then forgotten. How little did we ever dream that in so doing we were calling into life one of the most subtle, active, and universal agents in nature—a spirit like Ariel to carry our thoughts with the speed of thought to the uttermost ends of the earth—a workman more delicate of hand than the Florentine Cellini, and more resistless in force than the Titans of old!

If now we place a piece of zinc, Z, and of copper, C, in a glass of acidulated water, instead of in the saliva of the mouth, and if we then attach to the piece of zinc the wire D K, and to the piece of copper the wire B A, and approximate the two ends, A K, until they touch, we shall have the philosophic expression of the contrivance of the boy—a decomposition of the water will immediately take place, and either as its cause or consequence—for scientific men have not yet decided which—an electric current will flow in a continued stream from the zinc plate or positive pole to the copper plate or negative pole of the battery, and this action, provided the plates are kept clean and the acidulated water is supplied, will go on as long as the materials last. If this little instrument, which generates a very small amount of electric force, is combined with others, as in figure 2,—the zinc plate of one cell being connected with the copper plate of the next by a piece of wire—we shall have the celebrated battery invented by Volta in 1800, in which the accumulated current, after flowing from one cell into another, by means of the little hoops of wire, is transmitted along the large hoop, D K A B, from the one pole of the battery to the other. Within the narrow chambers of some such battery (which may be made of any number of cells, according to the force required), the motive power is generated by which the electric telegraph is worked, and the large hoop by which

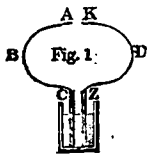


Fig. 1.

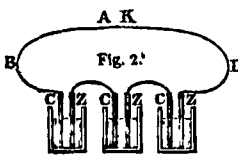


Fig. 2.

its two poles are connected represents the telegraphic wire we see running beside the railroad, whose office is to form a conducting pipe for the conveyance of the electricity. Different substances possess this property in various degrees; some, such as dry paper, not permitting the passage of the electric fluid to any sensible extent; and others transmitting it with great freedom. Of all known bodies, the metals are the most perfect conductors, and copper is in this respect superior to iron; but the latter, being cheaper and more durable, is commonly employed in the construction of the telegraph. Thus we have two of the indispensable requisites—a constant force and a channel which conveys it from place to place.

There was yet a third thing necessary—some contrivance by which the force could be made instrumental in forming signs or characters at its destined goal; and this final condition was supplied by Oersted's discovery in 1819, that a *magnetic* needle is deflected by the passage of a circuit of electricity through a wire parallel and in close neighbourhood to it. The following cut will explain our meaning:—When the fluid passes from the U pole of the battery in the direction of B A K L M Z, and enters V, its opposite pole, "a current," as it is called, is completed, running from left to right, the effect of which upon the needle, N, is to deflect it in the direction of the dotted line (seen in perspective) 2, 3, or to an angle of 90 degrees, with the wire, if the current is sufficiently strong. If, however, the current be reversed, and the electric fluid made to traverse the wire from right to left, in the direction of the letters V Z M L K A B, to the U end of the battery, the needle will immediately reverse its position and place itself at 90 degrees in the opposite direction. This then is the whole principle and mystery of the needle telegraph, the one still most extensively used in this country. The break that occurs

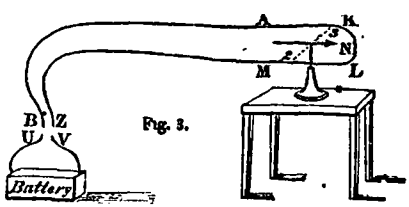


Fig. 3.

between the letters B U and Z V is intended to show the method in which the needle is made to work. Whilst the wires are thus apart the "circuit is broken," or the fluid no longer passes along the wire, but immediately they are approximated the circulation again commences, and the needle "answers the helm." By the opening and closing, then, of this small space, which is effected by a lever, the needle is made to oscillate at will.

The mere fact, however, of an electric current passing along a wire in proximity to a magnetic needle was not sufficient to enable any person to construct a telegraph. Would the needle be deflected by a wire, the battery of which was placed at any considerable distance? it would not; therefore, for all telegraphic purposes Oersted's discovery was worthless. Schweigger,

Fig. 4.

however, soon after ascertained that by passing a great number of times round the needle a wire, thoroughly insulated by a "serving" of silk thread, as shown in figure 4, the deflecting powers of the currant were *multiplied*, and the sensibility of the instrument marvellously increased.

In the same year that Oersted made his brilliant discovery, M. Arago detected another law, which furnished a second method by which the electric current could be made to tell its tale. He announced to the French Academy the fact so pregnant in its consequences, that the fluid possessed the power of imparting magnetism to steel or iron; and shortly afterwards our own countryman, Sturgeon, invented the first electro-magnet, by coiling around a piece of soft iron a great length of fine insulated copper wire, the ends of which communicated with a battery. Figure 5 will give a rough idea of this instrument. The wire U B A, when it reaches the cylinder K L, is wound many times round it, and returns to the battery at V. As long as the current is passing, the soft iron becomes a magnet and attracts the iron armature P; but directly the circuit is broken its magnetic power ceases, and P, by the action of a spring,

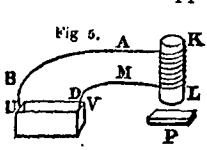


Fig 5.

flies back. It will at once be seen that by alternately making and breaking the circuit, which can be done as fast as the hand can move the handle of a lever, an up and down movement of the armature P will take place, and this is the principle of action in Wheatstone's electro-magnetic dial instrument and Morse's recording telegraph, so extensively used in America. The general *modus operandi* of the latter, which is a contrivance of singular merit and efficiency, can be easily understood. At the station at which the message is received, a poised iron lever has a metal pin on its upper surface at one end, and an armature on its under surface at the other end. When the magnet, which is placed beneath the armature, attracts and draws it down, the pin at the opposite extremity is raised, and presses against a strip of paper, which is moved between the metal point, and a roller supported above it, at a uniform rate by means of clock-work. The pin or style will then make a simple dot, or trace lines of variable length upon the paper, according as the electric current is kept up only for a single instant, or for a longer period. "The impressions on the paper," says Dr. Turnbull, "resemble the raised printing for the blind." Out of these dots and lines an alphabet is formed similar to that which we have given in a subsequent page, when speaking of the chemical telegraph at Bain. The instrument of Morse requires only a single wire to work it, and is, says the Abbé Moigno, "an excellent telegraph, very simple, very efficacious, and very rapid in its transmissions. A practised clerk can indent on an average seventeen words a minute, which is consequently as many as a skilful writer could transcribe with a pen. It is, moreover, a great advantage to have fixed on a band of paper the messages which the needle telegraphs merely figure in the air."

Since the year 1821 the principles of action of two of the working telegraphs of the present day were known to scientific men, and the question naturally arises, how was it that it still took so many years to make the telegraph a working fact? The answer is, that the combination of circumstances necessary to bring it to perfection had not arisen. What interest had

practical men in carrying out the dreams of philosophers? No one imagined that it would ever become a necessary social engine, or that it would pay "seven per cent." to a public Company. The patronage of the Government could alone have been looked to by any of the proposers of the new method of telegraphy, and the sort of encouragement received from this quarter may be judged from the fact that when Mr. Ronalds attempted to draw the attention of some of the officials to the working of his instrument, they did not even deign to pay it a visit, but returned for answer, "That the telegraph was of no use in time of peace, and that the semaphore in time of war answered all the required purposes." The occasion that suddenly ripened the invention and brought it into practical operation was the introduction of railroads. Were it not for the universal spread of this new means of locomotion, the telegraph might still have remained in that limbo from which so many discoveries have never emerged. The vast advantage to a railroad of a method of conveying signals instantaneously throughout its entire length was at once seen, and the continuity of its property, together with the protection afforded by its servants, presented facilities for its introduction and maintenance which had never before occurred.

A problem of great scientific interest as well as of practical importance in connection with the electric telegraph had still to be solved. The experiments of Dr. Watson on Shooter's Hill, in the middle of the last century, proved, it is true, that *a shock of electricity* passed along a four mile circuit without any appreciable loss of time, but nothing was definitely known about the speed at which it really travelled. This difficult question was answered by Professor Wheatstone. His beautiful investigations on the subject were made by means of a very rapidly revolving mirror, upon which the passage of the electric fluid, at different and distant parts of a severed wire, was indicated by sparks, which appeared as lines of light on the rapidly turning glass, on the same principle that a bit of lighted charcoal whirled round and round in the air appears as a circle of fire. By this instrument, which we cannot render

intelligible to the general reader, but for a fuller account of which we refer him to the Philosophical Transactions of 1834, he made it evident to the eye that one spark or leap of the electric fluid did occur before the other—thus proving that its transit along the wire *was* a matter of time. The manner in which he took measure of this infinitesimal period was extremely ingenious. By attaching a hollow piece of metal—a metallic humming-top as it were—to the spindle of his revolving mirror, and at the same time directing a current of air against it, he was enabled to test its speed by the pitch of the sound produced: this once known, the measuring of time that elapsed between the different sparks was easy. Thus he forced the lightning to tell how fast it was going. His admirably-contrived apparatus has since proved of considerable use to philosophers in measuring very minute parts of time, and scientific men can now with the greatest ease ascertain the period a flash of light takes to traverse a distance of 50 feet —and light, be it remembered, travels at the speed of 200,000 miles a second!

By this experiment it appeared that electricity travels through a copper-wire with at least the velocity of light through the celestial space, though the recent experiments made for Professor Bache, director of the national survey of America, have proved that the velocity of the current through suspended *iron* wires is not more than 15,400 miles per second. The philosophic proof of the marvellous rate at which the electric current moved, doubtless turned many minds once more in the direction of the long sought for telegraph, and it is not surprising that the eminent elucidator of the fact was among the number. A short time after this he insulated four miles of wire in the vaults of King's College, on which he performed most of his subsequent experiments.* Thus in the

* It may interest our readers to reproduce the first published notice we can find of Professor Wheatstone's experiments relating to the electric telegraph, and which appeared anterior to his connection with Mr. Cooke:—"During the month of June last year (1836), in a course of lectures delivered at King's College, London, Professor Wheatstone repeated his experiments on the velocity of electricity which were pub-

silence of these gloomy vaults, as early as 1836, the lightning that was to flash with intelligence round the world—the nervous system so shortly destined to spread itself through two hemispheres, string together continents and islands, and carry human thought under the wide-spreading seas, was slowly being trained to the service of man by one of the most distinguished of the many philosophers who have contributed to the development of this branch of science.

Following up his experiment, Professor Wheatstone worked out the arrangements of his telegraph, and having associated himself in 1837 with Mr. Cooke, who had previously devoted much time to the same subject, a patent was taken out in the June of that year in their joint names. Their telegraph had five wires and five needles; the latter being worked upon the face of a lozenge-shaped dial inscribed with the letters of the alphabet, any one of which could be indicated by the convergence of two of the needles. This very ingenious instrument could be manipulated by any person who knew how to read, and did not labour under the disadvantage of working by a code which required time to be understood. Immediately upon the taking out of the patent, the directors of the North Western Railway sanctioned the laying down of wires between the Euston Square and Camden Town stations, and towards the end of July the telegraph was ready to work.

lished in the *Philosophical Transactions* for 1834, but with an insulated circuit of copper wire, the length of which was now increased to nearly four miles; the thickness of the wire was 1-16th of an inch. When machine electricity was employed, an electrometer placed on any point of the circuit diverged, and, wherever the continuity of the circuit was broken, bright sparks were visible. With a voltaic battery, or with a magneto-electric machine, water was decomposed, the needle of the galvanometer was deflected, &c., in the middle of the circuit. But, which has a more direct reference to the subject of our esteemed correspondent's communication from Munich, Professor Wheatstone gave a sketch of the means by which he proposes to convert his apparatus into an electrical telegraph, which, by the aid of a few finger stops, will instantaneously, and distinctly, convey communications between the most distant points. These experiments are, we understand, still in progress, and the apparatus, as it is at present constructed, is capable of conveying thirty simple signals, which, combined in various manners, will be fully sufficient for the purposes of telegraphic communication."—From the *Magazine of Popular Science* (Parker, Strand) for March 1, 1837.

Late in the evening of the 25th of that month, in a dingy little room near the booking-office at Euston square, by the light of a flaring dip-candle, which only illuminated the surrounding darkness, sat the inventor, with a beating pulse and a heart full of hope. In an equally small room at the Camden Town station, where the wires terminated, sat Mr. Cooke, his co-patentee, and among others, two witnesses well known to fame, Mr. Charles Fox and Mr. Stephenson. These gentlemen listened to the first word spelt by that trembling tongue of steel which will only cease to discourse with the extinction of man himself. Mr. Cooke in his turn touched the keys and returned the answer. "Never did I feel such a tumultuous sensation before," said the Professor, "as when all alone in the still room I heard the needles click, and as I spelled the words I felt all the magnitude of the invention, now proved to be practical beyond cavil or dispute." The telegraph thenceforward, as far as its mechanism was concerned, went on without a check, and the modifications of this instrument, which is still in use, have been made for the purpose of rendering it more economical in its construction and working, two wires at present being employed, and in some cases only one.

A frequently renewed and still unsettled controversy has arisen upon the point of who is to be considered the first contriver of the telegraph in the form which made it available for popular use. Two names alone are now put forward to dispute the claim with Wheatstone—Steinheil of Munich and Morse of New York.

From a communication of M. Arago to the French Academy of Sciences, it appears that the telegraph of Steinheil was in operation, for a distance of seven miles, on the 19th of July, 1837, the same month in which Wheatstone put his own contrivance to the test upon the North Western Railway. But besides that the patent of Wheatstone was taken out in the preceding June, and was itself founded upon previous and thoroughly successful experiments, there is another material circumstance which gives him a claim to priority over Steinheil, viz., that the latter published no description of his instrument

until August, 1838, that he altered and improved it in the interval, and that the only accounts we have of his contrivance describe its amended and not its original form. It was, however, a very meritorious performance, and, in addition to its other excellences, Steinheil was the first who employed the earth to complete the circuit—a most important fact, which we shall explain hereafter. Still his telegraph was inferior in its mechanical arrangements to that of Wheatstone, and the inventor himself soon abandoned it in favour of a modification of the instrument of Morse.

Morse dates his claim to *the invention of the telegraph* from the year 1832, when the first idea of such an instrument, he tells us, struck him as he was returning home from Havre in the ship Sully. A fellow-passenger, Professor Jackson, it appears, was in the habit of amusing himself, in common with the rest of the passengers, with some accounts of the wonders of electricity; and when Morse later developed his contrivance, Professor Jackson not only claimed it as a plagiarism from his own conversation, but added that Morse was so ignorant as to ask, upon hearing the term Electro-Magnetism, "In what does that differ from ordinary Magnetism?" The telegraph was at best, on the part of both of them, a crude idea; and it was not till September, 1837, that Professor Morse was able to exhibit his still imperfect machinery in action. He ultimately succeeded, as we have before stated, in producing a telegraph of first-rate excellence; and, out of 15,000 miles of wire which had been erected by 1852 in the United States, 12,124 were worked on the system of Morse.

The question of priority is, in our opinion, after all, of no sort of importance, at least as regards the rival claims of Wheatstone and Steinheil. When the progress of science has prepared the way for a great discovery, two geniuses will occasionally take the step together, because each is able to take the step of a giant. It was thus that the Calculus was found out by both Newton and Leibnitz, and the place of Neptune in the heavens by both Adams and Leverrier. It was the same with the telegraph. The investigations of Wheatstone and Stein-

heil were entirely independent of each other, and it cannot lessen the merit of either that there was a second man in Europe who was equal to the task.

There are some who dispute Professor Wheatstone's claim, by urging that, inasmuch as all the main features of the telegraph existed before he took out his patent, there was nothing left to invent. It is true that much had been done, but it is equally certain that there was much to do. When Wheatstone first directed his attention to electricity as a means of communicating thoughts to a distance, the telegraph was a useless and inoperative machine. He and his partner established as a working, paying fact, what had hitherto been little better than a philosophic toy. To those who now disparage the Professor's labours we think it sufficient to reply by the admirable saying of the French *savant*, M. Biot, "Nothing is so easy as the discovery of yesterday; nothing so difficult as the discovery of to-day."

Let us return, however, to the history of the telegraph in England, from which we have digressed. After the successful working of the mile-and-a-quarter line, the Directors of the London and Birmingham Railway proposed to lay it down to the latter town if the Birmingham and Liverpool Directors would continue it on their line; but they objected, and the telegraph received notice to quit the ground it already occupied. Of course, its sudden disappearance would have branded it as a failure in most men's minds, and, in all probability, the telegraph would have been put back many years, had not Mr. Brunel, to his honour, in 1839, determined to adopt it on the Great Western line. It was accordingly carried at first as far as West Drayton, thirteen miles, and afterwards to Slough, a distance of eighteen miles. The wires were not at this early date suspended upon posts, but insulated and encased in an iron tube, which was placed beneath the ground.

The telegraph hitherto had been strictly confined to railway business, and in furtherance of this object Brunel proposed to continue it to Bristol as soon as the line was opened. Here, again, the folly and blindness of railway proprietors threw obstacles in the way, which led, however, to an unlooked-for

application of its powers to public purposes. At a general meeting of the proprietors of the Great Western Railway in Bristol, a Mr. Hayward, of Manchester, got up and denounced the invention as a "new-fangled scheme," and managed to pass a resolution repudiating the agreement entered into with the patentees. Thus within a few years we find the telegraph rejected by two of the most powerful railway companies, the persons above all others who ought to have welcomed it with acclamation.

To keep the wires on the ground, Mr. Cooke proposed to maintain it at his own expense, and was permitted by the directors to do so on condition of sending their railway signals free of charge, and of extending the line to Slough. In return, he was allowed to transmit the messages of the public. Here commences the first popular use of the telegraph in England, or in any other country. The tariff was one shilling per message. The effect of this low charge was to develop a class of business which seems beneath the notice of the powerful company now in possession of most of the telegraphic lines in the kingdom. The transactions of the retail dealers are considered too petty, perhaps, for their attention; but there can be no doubt that the comfort of the public would be vastly increased, and also the revenues of the company, if they would only condescend to take a lesson by the commercial experience of this shilling tariff, the working of which we will illustrate by transcribing from the telegraph book at Paddington a few specimens of the messages sent:—

"Commercial News. 1844, Nov. 1, Slough, 4.10 P.M.—'Send a messenger to Mr. Harris, poulterer, Duke-street, Manchester-square, and order him to send twelve more chickens to Mr. Finch, High-street, Windsor, by the 5.0 P.M. down train, without fail.' Answer: Paddington, 5.5 P.M.—'The chickens are sent by the 5.0 P.M. train.'

"Slough, 7.35 P.M.—'A Mr. Thomas B., a first-class passenger, 6.30 P.M. train, left a blue cloak with a velvet collar in first-class booking-office. Send it by mail train if found.'

"Paddington 7.45 P.M.—'There are two such cloaks in the booking-office: has Mr. B.'s any mark on any part of it?' Slough, 7.47 P.M.—'Mr. B.'s has the mark × under the collar, inside.'

"Paddington, 7.55 P.M.—'Cloak found, and will be sent on as requested.'

"Slough, Nov. 11, 1844, 4.3 P.M.—'Send a messenger to Mr. Harris,

Duke-street, Manchester-square, and request him to send 6 lbs. of white bait and 4 lbs. of sausages, by the 5.40 train, to Mr. Finch, of Windsor; they must be sent by 5.30 down train, or not at all.'

"Paddington, 5.27 P.M.—'Messenger returned with articles, which will be sent by 5.30 train, as requested.'"

The first application of the telegraph to police purposes took place about this time on the Great Western Railway, and, as it was the first intimation thieves got of the electric constable being on duty, it is full of interest. The following extracts are from the telegraph book kept at the Paddington station :—

"Eaton Montem day, August 28, 1844.—The Commissioners of Police have issued orders that several officers of the detective force shall be stationed at Paddington to watch the movements of suspicious persons, going by the down-train, and give notice by the electric telegraph to the Slough station of the number of such suspected persons, and dress, their names if known, also the carriages in which they are."

Now come the messages following one after the other, and influencing the fate of the marked individuals with all the celerity, certainty, and calmness of the Nemesis of the Greek drama :—

"Paddington, 10.20 A.M.—'Mail train just started. It contains three thieves, named Sparrow, Burrell, and Spurgeon, in the first compartment of the fourth first-class carriage.'

"Slough, 10.48 A.M.—'Mail train arrived. *The officers have cautioned the three thieves.*'

"Paddington, 10.50 A.M.—'Special train just left. It contained two thieves: one named Oliver Martin, who is dressed in black, *crape on his hat;* the other named Fiddler Dick, in black trowsers and light blouse. Both in the third compartment of the first second-class carriage.'

"Slough, 11.16 A.M.—'Special train arrived. Officers have taken the two thieves into custody, a lady having lost her bag, containing a purse with two sovereigns and some silver in it; one of the sovereigns was sworn to by the lady as having been her property. It was found in Fiddler Dick's watch-fob.'"

It appears that, on the arrival of the train, a policeman opened the door of the "third compartment of the first second-class carriage" and asked the passengers if they had missed anything? A search in pockets and bags accordingly ensued, until one lady called out that her purse was gone. "Fiddler Dick, you are wanted," was the immediate demand of the police-officer, beckoning to the culprit, who came out of the carriage thunderstruck at the discovery, and gave himself up, together

with the booty, with the air of a completely beaten man. The effect of the capture so cleverly brought about is thus spoken of in the telegraph book :—

"Slough, 11.51 A.M.—'Several of the suspected persons who came by the various down-trains are lurking about Slough, uttering bitter invectives against the telegraph. Not one of those cautioned has ventured to proceed to the Montem.'"

Ever after this the lightfingered gentry avoided the railway and the *too* intelligent companion that ran beside it, and betook themselves again to the road—a retrograde step, to which on all great public occasions they continue to adhere.

The telegraph, even up to this period, was very little known to the great mass of the public, and might have continued for some time longer in obscurity but for its remarkable agency in causing the arrest of the quaker Tawell. This event, which took place on the afternoon of Friday, January 3rd, 1845, placed it before the world as a prominent instrument in a terrible drama, and at once drew universal attention to its capabilities.

It must not be imagined, however, that Mr. Wheatstone's was the only patent taken out for a telegraph in the year 1837. A number of inquiring minds were simultaneously with the Professor wandering in the tangled wood of doubt, and when he burst his way through, others speedily emerged at different points, one after another. Consequently, the year 1837 was distinguished by a complete crop of telegraphs, any one of which would perhaps have held its ground had it stood alone, but not one of them was practically equal to the first, and they have all long since departed to the tomb, already stored with the abortive results of so many merely ingenious minds.

The rapidity with which the needle instrument transmits messages, the small amount of electricity required to work it, and the simplicity of its construction, are its chief recommendations. Upwards of 200 letters can be forwarded by it within the minute. Its great drawback—a drawback that will appear greater every year—is that it can only be worked by a system of signs, which requires some practice to understand.

As long as the public is content to send its messages open to the light of day, this plan will hold its ground, as a practised manipulator can indicate the letters as fast as it is possible to read, much less transcribe them, at the other end of the wire; but immediately that the public come to demand secrecy—to put a seal as of old on its letters—this telegraph will, we predict, fall into *public* disuse; and the revolving dial telegraph, invented by Mr. Wheatstone, in 1840, or the recording telegraph of Bain or Morse, or, more likely still, the American printing telegraph of House, will come into play.

This latter instrument appears to contain within itself capabilities of very high excellence; for instance, it requires no one to interpret, and then to re-write its messages—this it does itself. In fact it extends the compositor's fingers as far as the wire can be stretched. Messages are thus printed at the rate of fifty letters a minute, say at five hundred miles distance, in common Roman characters, on long slips of paper similar to those used on the recording instrument. Any description of its complicated mechanism would be utterly unintelligible to general readers. "While the arrangements of the telegraph of Morse," said Mr. Justice Woodbury, of America, in giving judgment in a patent case, "can be readily understood by most mechanics and men of science, it requires days, if not weeks with some, thoroughly to comprehend all the parts and movements of the telegraph of House." His system is in use for thousands of miles of the American lines. Bakewell's copying telegraph is naturally suggested by the telegraph of House, from the fact that it reproduces its messages, although in a different manner. The sender of the message may be said to write with a pen long enough to stretch to the most distant correspondent; that is, he not only forwards instantaneously the substance of a message, but it is conveyed in his own handwriting. The principle is similar to that of Davy's chemical recording telegraph. The person sending the message writes it on a piece of tin foil with a pen dipped in varnish or any other non-conducting substance; this message is then placed round a metal cylinder, which is made to revolve at a certain regulated

pace. In contact with this cylinder is a blunt steel point, which, by the action of a screw, makes a spiral line from the top to the bottom of the cylinder, thus touching every portion of the written message enveloping it. In connection with the steel point is the conducting wire, and at the end of the wire is a similar steel point working spirally upon a like cylinder. It will be at once seen that the current will always be transmitted, except at those portions of the tin foil which are covered with the non-conducting varnish, and which, therefore, cut off the flow of electricity, and the handwriting will appear at the other end of the telegraphic wire upon a piece of chemically-prepared paper rolled upon its cylinder, and moving synchronously with it. The transmitted letter appears to be written in white upon a dark ground, the white parts, of course, indicating where the current has been broken, and where, consequently, no decomposition of the chemical paper has taken place.

To return, however, to our subject after this little digression. At the same time that the first working telegraph was being simplified and improved, the system was gradually spreading, and, by the end of the year 1845, lines exceeding 500 miles in extent were in operation in England, working Messrs. Wheatstone and Cook's patents. In the following year, capital, as represented by the powerful Electric Telegraph Company, commenced its operations, and an immediate and rapid development of the new method of carrying intelligence was the result.

"A period of eight years has elapsed," as they say in a certain class of drama, and let us now look upon the condition of electro-telegraphy in England. We left it exerting its influence in a disjointed manner over a few railways, and striking out its wires here and there at random, without governing head or organization; and how do we find it?

Jammed in between lofty houses, at the bottom of a narrow court in Lothbury, we see before us a stuccoed wall, ornamented with an electric illuminated clock. Who would think that behind this narrow forehead lay the great brain,—if we may so term it,—of the nervous system of Britain, or that beneath

the narrow pavement of the alley lies its spinal chord, composed of hundreds of fibres, which transmit intelligence as unperceived as does the medulla oblongata beneath the skin? Emerging from this narrow channel, the "efferent" wires branch off beneath the different footways, ramify in certain plexuses within the great centre of intelligence itself, and then shoot out along the different lines of railway until the shores of the island would seem to interpose a limit to their further progress. Not so, however:—beneath the seas, under the heaving waves covered with stately navies, they take their darksome way, until, with the burden of their moving fire, they emerge once more upon the foreign strand, and commence afresh their career over the wide expanse of the Continent.

And now, like a curious physiologist, let us examine the various parts of this ingeniously-constructed sensorium, and endeavour to show our readers how in this high chamber, fashioned by human hands, thoughts circulate, and ideas come and go. The door of the "Central Telegraph Station" leads immediately into the Central Hall, an oblong space, open quite up to the roof, which presents an appearance something like the Coal Exchange or the Geological Museum, two tiers of galleries being suspended from the bare walls, and affording communication to the different parts of the building. If we ascend the first gallery, and lean over the balustrade, we shall get a very clear bird's-eye view of the method in which messages are received and transmitted. Here, man, like the watchful spider, sits centered within his radiating web, and "lives along the line." Beneath us runs a sweep of counter forming three sides of a quadrangle, divided into compartments of about a square yard by green curtains. A desk and printed forms, to be filled up, are placed in each of these isolated cells, towards which we see individuals immediatly make, and then bury themselves, being for the time profoundly intent upon the printed form.

We all know the jocose excuse of the correspondent for having written a long letter—that he had not time to make it shorter. And truly it requires some art to be laconic enough

to satisfy the pocket in this establisment. Let us watch, for instance, yonder youth: he seems to have filled his sheet very close—now he gives it in to the receiving-clerk, and something evidently is wrong, for he looks perplexed—it is some hitch about the charge, for his attention is directed to the scale of prices printed at the head of the paper.

"Messages (not exceeding twenty words) can be sent between all the principal towns in Great Britain at a charge of 1*s.* within a circuit of 50 miles, of 2*s.* 6*d.* within a circuit of 100 miles (geographical distance), and of 5*s.* beyond a circuit of 100 miles, with an additional sum of 6*d.* porterage within half a mile of the station."

"Economy," says a French writer, M. de Courcy, "teaches conciseness. The telegraphic style banishes all the forms of politeness. 'May I ask you to do me the favour,' is 6d. for a distance of fifty miles." How many of those fond adjectives, therefore, must our poor fellow relentlessly strike out to bring his billet down to a reasonable charge! What food for speculation each person affords, as he writes his hurried epistle, dictated either by fear, or greed, or more powerful love!—for we have not yet got into the habit of employing the telegraph, like the Americans, on the mere every-day business of life. Every message—and of these there are 350,000 transmitted by this Company yearly for the public, and upwards of 3,500,000 for the Railways—is faithfully copied, and put by in fire-poof safes, those sent by the recording telegraph being wound in tape-like lengths upon a roller, and appearing exactly like discs of sarcenet ribbon. Fancy some future Macaulay rummaging among such a store, and painting therefrom the salient features of the social and commercial life of England in the nineteenth century. If from the Household Book of the Duke of Northumberland, or still later, from the Paston Letters, we can catch such glimpses of the manners of an early age, what might not be gathered some day in the twenty-first century from a record of the correspondence of an entire people?

"Softly, softly," interposes the Secretary of the Company, "we have no such intention of gratifying posterity; for, after a certain brief period, all copies of communications are de-

stroyed. No person unconnected with the office is, under any consideration, allowed to have access to them, and the servants of the Company are under a bond not to divulge 'the secrets of the prison-house.'" Very good, as far as the present generation is concerned; nevertheless, it is devoutly to be wished that an odd box or two of these sarcenet ribbons, with their linear language, may escape, for future Rawlinsons to puzzle over and decipher for the instruction of mankind.

Whilst we have been thus speculating, however, a dozen messages for all parts of the kingdom have successively ascended, through the long lift before us, to the instrument-rooms, of which there are two, situated in the attics of the establishment, on either side of the top gallery of the central hall; these, to carry out our anatomical simile, might be called the two hemispheres of the establishment's cerebrum. The instruments of one of these rooms are worked by youths, while those of the other are manipulated by young ladies; and it seems to us as though the directors were pitting them against each other—establishing a kind of industrial tournament—to see which description of labourer is worthiest. As yet, little or no difference can be detected: this, however, is in itself a triumph for the fair sex, as it proves their capacity for a species of employment well calculated for their habits and physical powers, and opens another door for that superabundance of female labour of a superior kind which has hitherto sought employment in vain.

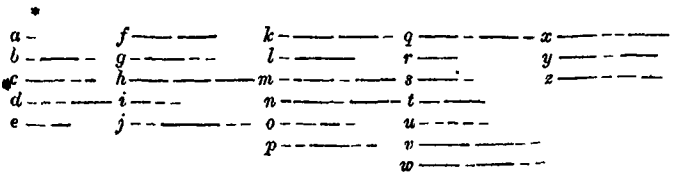
Click, click, go the needles on every hand as we enter. Here we see the iron tongues of the telegraph wagging, and talking as fast as a tea-table full of old maids. London is holding communication with Manchester. Plymouth is listening attentively to a long story, and every now and then intimates by a slight movement that he perfectly comprehends. But there is one speaker whose nimble tongue seems to be saying important things by the stir around him,—that is *the Hague* whispering under the North Sea the news he has heard, an hour or so ago, from Vienna of a great victory just gained by the Turks. We are witness to a series of conversations carried on with all

corners of the island, and between the metropolis of the world and every capital of northern and central Europe, as intimately as though the speakers were bending their heads over the dinner-table, and talking confidentially to the host. And by what agency is this extraordinary conversation carried on? All that the visitor sees is a number of little mahogany cases, very similar to those of American clocks, each having a dial, with two lozenge-shaped needles working by pivots, which hang, when at rest, perpendicularly upon it. Two dependant handles, situated at the base of this instrument, which the operator grasps and moves from side to side at his will, suffice to make and break the currents or reverse them, and consequently to deflect the needles either to the right or left. Two little stops of ivory are placed about half an inch apart, on either side of the needle, to prevent its deflecting too much, and to check all vibration. It is the sound of the iron tongue striking against these stops that makes the clicking, and to which the telegraphists are sensitively alive. In the early days of telegraphy, the operator's attention, at all the stations, was drawn to the instrument by the sudden ringing of an alarum, which was effected by the agency of an electro-magnet; but the horrid din it occasioned became insupportable to persons in constant attendance, and this part of the instrument was speedily given up, the clicking of the needle being found quite sufficient to draw his attention to the arrival or passing of a message. We say *or passing* of a message, because, when a communication is made, as for instance, between London and Edinburgh, the needles of all the telegraph-stations on the line are simultaneously deflected, but the attendant has only to take notice of what is going on when a special signal is made to his particular locality, informing him that *he* is spoken with. A story is told of a certain somnolent station clerk, who, in order to enjoy his nap, trained his terrier to scratch and awaken him at the first sound of the clicking needles.

There are but two kinds of telegraph used by the company, the needle telegraph and a few of the chemical recording telegraph of Bain. The latter instrument strikes the spectator

more, perhaps, than the nimble-working needle apparatus, but its action is equally simple. Slits of variable length representing letters, according to the alphabet in the note,* are punched out from a long strip of paper called the message-strip, which is placed between a revolving cylinder and a toothed spring. The battery is connected with the cylinder; the wire, which goes from station to station, is joined to the spring. As dry paper is a non-conductor, no electricity passes while the unpierced portion of the message-slip interposes between the cylinder and the tooth; but when the tooth drops into a space, and comes in contact with the cylinder, the current flows. If we now transfer our attention to the station at which the message is received, we find a similar cylinder revolving at a regular rate, and a metal pin, depending from the end of the telegraph wire, pressing upon it; but in this case the paper between the cylinder and the pin has been washed with a solution of prussiate of potash, which electricity has the effect of changing to Prussian blue at the point where the pin touches it. Therefore, as the chemically prepared paper moves under the pin, a blue line is formed of the same length as the slits at the other end, which regulate the duration of the electric current; and thus every letter punched upon the message-strip is faithfully transferred to its distant fellow. Such is the celerity with which the notation is transmitted by this method, that "in an experiment performed by M. Le Verrier and Dr. Lardner, before committees of the Institute and the Legislative Assembly at Paris, despatches were sent 1,000 miles at the rate of nearly 20,000 words an hour." In ordinary practice, however, the speed is limited to the rate at which an expert clerk can punch out the holes, which is not much above a hundred per minute. Where the object was to forward long documents, such as a speech, a number of persons

*



could be employed simultaneously in punching out different portions of the message, and the message-strips would then be supplied as fast as the machine could work.

This system is used extensively in America. A weaker current of electricity than what is required for deflecting needles or magnetising iron, suffices to effect the requisite chemical decomposition. The conducting power of vapour or rain carries much of the electricity from the wires in certain states of the atmosphere; "and in such cases, where both Morse's and Bain's telegraphs are used by an amalgamated company in the same office, it is found convenient to remove the wires from Morse's instruments, and connect them with Bain's, on which it is practicable to operate when communication by Morse's system is interrupted.—(*Whitworth's Report*, p. 51.)

This chemical telegraph has also the advantage, in common with all recording instruments, that it leaves an indelible record of every message transmitted, and therefore is very useful when the mistake of a single figure or letter might be of consequence, which we will illustrate by a case which happened very lately. A stockbroker in the City received, during a very agitated state of the funds, an order to buy for a client in a distant part of the country, by a certain time of the day, 80,000*l.* of consols. This order being unusually large for the individual, the broker doubted its accuracy, and immediately made inquiries at the office. The message had luckily been sent by the recording instrument, and upon looking at the record it was immediately seen that the order was for 8,000*l.*, the transcriber having put in an 0 too much, for which, according to the rules of the company, he was incontinently fined. Now, here the error was immediately traced to the person who made it, and there was no need of telegraphing back to inquire if all were right, two matters of vital importance in such a transaction as this, involving so much personal responsibility; for if the purchase had been made and turned out unfortunate, the loss would indubitably have fallen upon the unhappy sharebroker.*

* In justice to the Company, which is very properly jealous of the particulars of its messages transpiring, we beg to state that we acquired the above fact from a person totally disconnected with the Electric Telegraph Office.

In all ordinary transactions, however, the needle instrument is preferable, because it transmits its messages much more quickly. The speed with which the attendants upon these instruments read off the signals made by the needles is really marvellous: they do not in some cases even wait to spell the words letter by letter, but jump at the sentence before it is concluded; and they have learned by practice, as Sir Francis Head says in "Stokers and Pokers," to recognize immediately who is telegraphing to them, say at York, by the peculiar *expression of the needles*, the long drawn wires thus forming a kind of human antennæ by which individual peculiarities of touch are projected to an infinite distance. To catalogue the kind of messages which pass through the room, either on their way from London or in course of distribution to it, would be to give a history of human affairs. Here, from the shores of this tight island, comes the morning news gathered by watchers, telescopes in hand, on remote headlands, of what ships have just hove in sight, or what craft have foundered or come ashore —to this room, swifter beyond comparison than the carrier-dove of old, the wire speeds the name of the winner of the Derby or the Oaks. How the four winds are blowing throughout the island; how stocks rise or fall every hour of the day in all the great towns and in the continental capitals; what corn is at Mark Lane, and what farmer Giles got a quarter of an hour since in a country town in Yorkshire, are equally known in the telegraph room. Intermixed with quotations of tallow and the price of Wall's End coals, now and then comes a love-billet, which excites no more sympathy in the clerk than in the iron that conveys it; or a notice that the sudden dart of death has struck some distant friend, is transmitted and received as unconcernedly as an account of the fall in Russian stock. When business is slack the telegraphists sometimes amuse themselves by an interchange of badinage with their distant friends. Sir Francis Head informs us that an absolute quarrel once took place by telegraph, and the two irritated manipulators were obliged to be separated in consequence.

In addition to this private message department there is, below stairs, an intelligence office, in which news published in the London morning papers is condensed and forwarded to the Exchanges of Liverpool, Bristol, Manchester, Glasgow, &c.* A few years since the company opened subscription rooms in all the large towns of the north, in which intelligence of every kind was posted immediately after its arrival in London; but the craving for early intelligence was not sufficient to induce the people to incur the expense, and, with the exception of the room at Hull, the establishments have all been shut up.

On Friday evening especially this department is very busy condensing for the country papers the news which appears in that exciting column headed "By Electric Telegraph, London, 2 A.M." Thus the telegraph rides express through the night for the broadsheets of the entire kingdom, and even steps across from Portpatrick to Donaghadee into the sister country, with its budget of latest intelligence, by which means the extremities of the two islands are kept as well *up* in the progress of important events as London itself. Upwards of 120 provincial papers each receive in this manner their column of parliamentary news of the night; and the *Daily Mail*, published in Glasgow, gets sometimes as much as three columns of the debates forwarded whilst the House is sitting. A superintendent and four clerks are expressly employed in this department; and early in the day, towards the end of the week, the office presents all the appearance of an editor's room. At seven in the morning the clerks are to be seen deep in the *Times* and other daily papers, just hot from the press, making extracts, and condensing into short paragraphs all the most important events, which are immediately sent off to the country papers to form "second editions." Neither does the work cease here; for no sooner is a second edition published in town, than its news, if of more than ordinary interest, is transmitted to the provinces. For instance: whilst we were in the company's telegraph room a short time since, the following intelligence was being served out

* Mr. Reuter now performs this duty both for home and foreign news.

to Liverpool, York, Manchester, Leeds, Bristol, Birmingham, and Hull :—

"EASTERN WAR—BATTLE ON THE DANUBE—FROM EVENING EDITION OF THE 'MORNING CHRONICLE.'

"*Vienna, Saturday, April 8th.*

"The journal *Fremden Blatt* announces, under date of Bucharest, 4th April, that a great battle was being fought at Rassova, about midway between Hirsova and Silistria, in the Dobrudscha. The result was not known. Mustapha Pasha is at the head of 50,000 men."

Arrived at the above-mentioned places, swifter than a rocket could fly the distance, like a rocket it bursts, and is again carried by the diverging wires into a dozen neighbouring towns. The announcement we have quoted comes opportunely to remind us that intelligence thus hastily gathered and transmitted has also its drawbacks, and is not so trustworthy as the news which starts later and travels slower. The "great battle of Rassova" has not yet been fought, and the general action announced through the telegraph was only a sanguinary skirmish.

The telegraphic organization of London, meagre as it is at present, would form alone a curious paper: "a province covered with houses," it demands a special arrangement, and accordingly we see day by day new branches opened within its precincts, by which means every part of the metropolis is being put in communication with the country and Europe.

The branch stations are, London Docks (main entrance); No. 43, Mincing Lane; General Post Office, St. Martin's-le-Grand; No. 30, Fleet Street; No. 448, West Strand; No. 17*a*, Great George Street, Westminster; No. 89, St. James's Street; No. 1, Park Side, Knightsbridge; No. 6, Edgeware Road; Great Western Railway Station; London and North-Western Railway Station; Great Northern Railway Station; Highbury Railway Station; Eastern Counties' Railway Station; Blackwall Railway Station; London and Brighton and South Coast Railway Station; and the London and South-Western Railway Station; of these only two are open night and day. The central office, strange as it might appear, is closed at half-past 8 o'clock P.M., and its wires are put in connection with those at the Charing Cross Station, which takes upon itself the night work—a sin-

gular proof, by the way, that London proper is deserted shortly after the hours of business are over. The Eastern Counties' office is also open at night, and forms the East End office of the company. These stations communicate with the central office in Lothbury, and form, in fact, direct feeders to it, just as the hundred suckers do to the zoophyte.

We have yet, however, to notice the special telegraphic communication which exists in the metropolis between place and place, either for governmental purposes or for social convenience. The most curious of these lines is the wire between the Octagon Hall in the new Houses of Parliament and the St. James's Street Commercial station. They should name this line from the "whipper-in" of the House, for it is nothing more than a call-wire for members. The company employ reporters during the sitting of Parliament, to make an abstract from the gallery of the business of the two Houses as it proceeds; and this abstract is forwarded, at very short intervals, to the office in St. James's Street, where *it is set up and printed*, additions being made to the sheet issued as the MS. comes in. This flying sheet is posted half-hourly to the following clubs and establishments:—Arthur's; Carlton; Oxford and Cambridge; Brook's; Conservative; United Service; Athenæum; Reform; Traveller's; United University; Union; and White's; hourly to Boodle's Club and Prince's Club; and half-hourly to the Royal Italian Opera. The shortest possible abstract is of course supplied—just sufficient, in fact, to enable the after-dinner M.P. so to economize his proceedings as to be able to finish his claret, and yet be in time for the ministerial statement, or to count in the division.

The wire to the Opera is a still more curious example of the social services the new power is destined to perform. An abstract of the proceedings of Parliament, similar to the above, but in *writing*, is posted, during the performance, in the lobby; and Young England has only to lounge out between the acts to know if Disraeli or Lord John Russell is up, and whether he may sit out the piece, or must hasten down to Westminster. The Opera House even communicates with the Strand Office, so

that messages may be sent from thence to all parts of the kingdom. The Government wires go from Somerset House to the Admiralty, and thence to Portsmouth and Plymouth by the South-Western and Great Western Railways; and these two establishments are put in communication, by means of subterranean lines, with the naval establishments at Deptford, Woolwich, Chatham, Sheerness, and with the Cinque Ports of Deal and Dover. They are worked quite independently of the Company, and the messages are sent in cipher, the meaning of which is unknown, even to the telegraphic clerks employed in transmitting it. In addition to the wires already spoken of, street branches run from Buckingham Palace and Scotland Yard (the head police-office) to the station at Charing Cross, and thence on to Founder's Court; whilst the Post-office, Lloyd's, Capel Court, and the Corn Exchange communicate directly with the Central Office.

The function, then, of the Central Office is to receive and redistribute communications. Of the manner in which these ends are accomplished nothing can be gained from a glance round the instrument-rooms. You see no wires coming into or emerging from them; you ask for a solution of the mystery, and one of the clerks leads you to the staircase and opens the door of what looks like a long wooden shoot placed perpendicularly against the wall. This is the great spinal cord of the establishment, consisting of a vast bundle of wires, insulated from each other by gutta percha. One set of these conveys the gathered-up streams of intelligence from the remote ends of the continent and the farthest shores of Britain, conducts them through London by the street lines underneath the thronging footsteps of the multitude, and ascends with its invisible despatches directly to the different instruments. Another set is composed of the wires that descend into the battery-chamber. It is impossible to realize the fact by merely gazing upon this brown and dusty-looking bundle of threads; nevertheless so it is, that they put us in communication with no less than 4,409 miles of telegraph, which is coterminous with the railway system of the island, and forms a complete network over its

entire surface, with the exception of the highlands of North Wales. It penetrates already into the wilds of Scotland, as we see the wire is carried on from Aberdeen to Balmoral.

The physiologist, minutely dissecting the star-fish, shows us its nervous system extending to the tip of each limb, and descants upon the beauty of this arrangement, by which the central mouth is informed of the nutriment within its reach. The telegraphic system, already developed in England, has rendered her as sensitive, to the utmost extremities, as the star-fish. Day by day and hour by hour everything that happens of importance is immediately referred to its centre at Lothbury, and this centre returns the service by spreading the information afresh in every direction. Thus, should an enemy appear off our coast, his presence, by the aid of the fibre, is immediately felt at the Admiralty, and an immediate reply sends out the fleet in chase. Should a riot occur in the manufacturing districts, the local authorities communicate with the Home Office, and orders are sent down to put the distant troops in motion. Does a murderer escape, the same wire makes the fact known to Scotland Yard, and from thence word is sent to the distant policemen to intercept him in his flight. The arm is scarcely uplifted quicker to ward off a sudden blow—the eye does not close with more rapidity upon an unexpected flood of light, than, by the aid of the telegraph, actions follow upon impressions conveyed along the length and breadth of the land. But, says our reader, suppose these wires should be severed or damaged, your whole line is paralyzed ; and how are you to find out where the fault may be ? Against these eventualities human foresight has provided : by testing from station to station along the line, the office soon knows how far the wires are perfect ; and if the breach of continuity should be in the subterranean street wires, there are iron testing-posts at every 500 yards distance, by the aid of which the workman knows where to make his repairs. Whilst all is being made right again, however, a curious contrivance is brought into play, in order to keep the communication open. Every one is acquainted with the action of the railway "switch,"

by which a train is enabled to leave one line of rails and run on to another. The telegraph has its switch also, and thus a message can be transferred from one line to another, or can be sent right *through* to any locality, without making a stoppage at the usual resting-place on its way. By this device, then, the "sick wires" can be altogether avoided. Suppose, for instance, that some accident had happened to the direct Bristol line, and it would not work in consequence, then the clerk at the Lothbury station would signal to Birmingham to switch the wire through to Bristol, or, in other words, to put him in communication with that place; this done, the message would fly along the North-Western line, look in at the Birmingham station, and immediately be off down the Midland wire to Bristol, arriving, to all perception, in the same latitude as quickly as though it had gone direct by the Great Western wire. Every large station is provided with a switching apparatus, and the Lothbury office has several. Here also there is a very curious contrivance called the "testing-box," which enables the manipulator to connect any number of batteries to a wire, in order to give extra power, without going into the battery vault.

These switches, testing, and battery boxes are of great service in certain conditions of the atmosphere. For instance, a thunderstorm, or more often a fog, will now and then so affect the conducting power of a wire, working through a long distance, that it is found impossible to send a message along it, in which case the clerk "dodges" the passing storm or fog by switching the dispatch round the country through a fine-weather wire. If however the foggy weather should continue, the manipulator has only to go to the battery box and couple on one or more batteries, just as fresh engines are put on a train going up an incline when the rails are "greasy." By thus increasing the power of the electric current the message is driven through the worst weather. Sometimes as many as six or eight 24-plate batteries are necessary to speed a signal to Glasgow. The more general way in such cases, however, is to transmit the dispatch to some intermediate station, where the message is repeated.

Let us now descend into the battery vaults—two long narrow

chambers, situated in the basement of the building. Who would think that in this quiet place, night and day, a power was being generated that exerted its influence to the very margin of this seagirt isle, nay, invaded the territories of Holland, Belgium, and France? Who would think that those long dusty boxes on the shelves were making scores of iron tongues wag hundreds of miles off? There are upwards of sixty Daniel's batteries in full employment in these vaults. They are ranked as sixes, twelves, and twenty-fours, according to the number of their elements or plates; and just like guns, the higher they rank the further they carry. The powerful twenty-fours work the long ranges of wire, and the smaller batteries the shorter circuits. Of course some of these batteries have harder work to do than others, and the "twenty-fours" working the North-Western line have much the busiest time of it. Considering the work done by them, their maintenance is not very costly. A twenty-four, when in full work, does not consume its zinc plates under three months, and a gill of sulphuric acid, diluted, is its strong but rather moderate allowance of liquid per month. Other batteries of the same force are satisfied with 1 lb. of sulphate of copper per month, with a little sulphate of zinc, and salt and water. The entire amount of electric power employed by the Company throughout the country is produced by 8000 12-plate batteries, or 96,000 cells, which are lined with 1,500,000 square inches of copper, and about the same of zinc. To work these batteries six tons of acid is yearly consumed, and fifty-five tons of sand; the principal use of the latter is to prevent the chemicals from slopping about, and the metal plates from getting oxidised too rapidly. The language of the "wire," with respect to the working of the telegraph, is very curious. For instance, when a distant station-clerk finds that a battery is not up to its work, by the weak action of the needles, he sends word that it requires "refreshment," and it is accordingly served with its gill of aquafortis, and, totally opposed to the doctrines of temperance, a "long-lived battery" owes its vitality to the strongest drink.

We have followed the wires down to one pole of their

respective batteries, and now we have to pursue them out of the opposite pole until they take to "earth." No electricity will flow from the positive pole Z of the battery (Fig. 2) unless the wire D K A B is connected, either by being itself unbroken, or by the interposition of some other conductor where a gap occurs, to the negative pole C. In the earlier telegraphs it was usual to have a return-wire to effect this purpose. But, strange as it may sound, it was discovered that the earth itself would convey the current back to the negative pole, and thus an entire length of wire was saved. Accordingly the earth completes the two hundred and odd different circuits, which pass their loops, as it were, through the central office. In order to get a "good earth" a hole was dug deep in the foundations, until some moist ground was found, *dry* soil being a very bad conductor, and into this a cylinder of copper, four inches in diameter and 40 lbs. in weight, was sunken, surrounded by a mass of sulphate of copper in crystals. All the earth wires of the establishment were then put in connection with this mass of metal, or earth plate.

The non-scientific reader will perhaps require a figure to explain to him our meaning, when we say that the earth is capable of completing the "circuit." In the accompanying diagram (No. 6) we have a battery, U V, in the central office in London, deflecting a needle N, say in Liverpool. The fluid

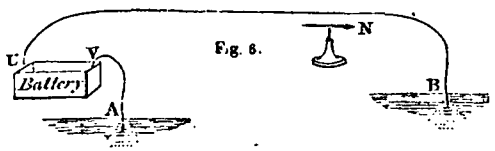


Fig. 6.

passes from the positive pole of the battery U, traverses the wire of the North-Western Railway, and after working the telegraph in Liverpool, descends into the earth by the wire B, which has a metal or earth-plate attached to it. From this point the electric fluid starts homewards, through the solid ground, and finding out the earth-plate* under the foundations

* The use of the metal or earth-plate will be understood from the fol-

at Lothbury, ascends along the wire A, into the negative pole of the battery V. By reversing the current, it flows first through the earth from V A to B, and returns by the wire to the opposite pole U.

Nothing in telegraphy impresses the thoughtful mind more than the fact that the electric fluid, after spanning, maybe, half the globe, should come back to its battery, through adamantine rocks, through seas and all the diverse elements which make up the anatomy of the globe. The explanation of the phenomenon is still a matter of pure speculation. Indeed, it may be objected that our flight of the electric principle is altogether a flight of fancy—that there is in fact no flow of electricity at all, but that its progress through bodies, according to the generally received theory, is owing to opposite poles of contiguous particles acting upon each other. The hypothesis, however, first received in science gives birth to its language, which usually continues the same, although it may have ceased to be an adequate expression of the current doctrine of philosophers.

The traveller, as he flies along in the train, and looks out upon the wires which seem stretched against the sky like the ledger lines of music, little dreams of these invisible conductors that are returning the current through the ground. In ninety-nine cases out of a hundred, indeed, the wires and their sustaining posts represent to the spectator the entire telegraph. The following conversation between two navigators, overheard the other day by a friend, gives the most popular view of the way the telegraph works. "I say, Jem, how do 'em *jaw* along them wires?" "Why, Bill, they pulls at one end, and rings a bell at t'other." Others again fancy that messages are conveyed

lowing statement of Steinheil:—"Owing to the low conducting power of water or the ground, compared with metals, it is necessary that at the two places where the metal conductor is in connection with the soil, the former should present very large surfaces of contact. Assuming that water conducts two million times worse than copper, a surface of water proportional to this must be brought into contact with the water. If the section of a copper wire is 0·5 of a square line, it will require a copper plate of 61 square feet surface in order to conduct the galvanic current through the ground, as the wire in question would conduct it."

by means of the vibrations of the metal, for on windy days they sometimes give out sounds like an Æolian harp: a fact which, according to Sir Francis Head, called forth the remark from a North-Western driver to his stoker, "I say, Bill, aint they a giving it to 'em at Thrapstone?" The more ignorant class of people actually believe that it conveys parcels and letters, and they sometimes carry them for transmission to the office.

Iron wire, coated with zinc, or "galvanised," as it is termed, to prevent its rusting, is now universally used as the conductor of the electric fluid when the lines are suspended in the air. The first rain falling upon the zinc converts it into an oxide of that metal, which is insoluble in water, so that henceforth in pure air it cannot be acted upon by that element, and all further oxidation ceases. Mr. Highton says, however, that in the neighbourhood of large manufacturing towns the sulphur from the smoky atmosphere converts the oxide into a sulphate of zinc, which is soluble, and consequently the rain continually washes it off the wire. He asserts that he has had wires in this manner reduced from the eighth of an inch to the diameter of a common sewing-needle. There has been a great controversy as to the best means of insulating the wires from their supporting-poles, which would otherwise convey the electricity from the wires to the earth. There is no method known of effecting this completely, but we believe it is now decided that stoneware is the best material for the purpose, both on account of its non-conducting qualities, and the readiness with which it throws off from its surface particles of water. The latter quality is extremely important, for, in very rainy weather, if the insulator should happen to get wet, the electric fluid will sometimes make a bridge of the moisture to quit the wire, run down the post to the earth, and make a short circuit home again to its battery. Indeed, when there are many wires suspended to the same pole on the same plane, a dripping stream of water falling from an upper to a lower one will often suffice to return the current before it has done its work, much to the telegraphist's annoyance. Not long ago, a mishap, having similar consequences, occurred on the line between Lewes and Newhaven,

owing to the following very singular circumstance: a crane, in its flight through the rain, came in contact with the wires, and having threaded his long neck completely through them, the current made a short cut along his damp feathers to the wire below, and by this channel home. Moisture, however, much as it may interfere for a time with the working of a line, rarely does any permanent injury. Lightning, on the contrary if not guarded against, is capable of producing great mischief. It has been known to strike and run for miles along a wire, and, in its course, to enter station after station, and melt the delicate coils and the finer portions of the instruments into solid masses. In most cases it reverses the polarity of the needles, or renders permanent the magnetism of the electro-magnets. All these dangerous and annoying contingencies are easily avoided by the application of a simple conducting-apparatus to lead away the unwelcome visitor. The method adopted by Mr. Highton is to line a small deal box, say ten or twelve inches long, with a tin plate, and to put this plate in connection with the earth. The wire bound up in bibulous paper—which is a sufficient insulator for the low-tensioned fluid of the battery—is carried, before it enters the instrument, through the centre of the box, and is surrounded with iron fillings. The high-tensioned electricity of the lightning instantly darts from the wire, through the pores of the paper, to the million points of the finely-divided iron, and so escapes to the earth. There are, of course, many kinds of lightning conductors used on different lines, but this one is simple in its construction, and, we are given to understand, answers its purpose exceedingly well.

Notwithstanding that the Electric Telegraph Company has been established so many years, it is only just now that the public have begun to understand the use of the "wire." The very high charges at first demanded for the transmission of a message, doubtless, made it a luxury rather than a necessary of life; and every reduction of the tariff clearly brought it within the range of a very much larger class of the community, as will be seen by the following table issued by the Company, which shows the advance of the system under its management.

In the half-years ending	Miles of Telegraph in operation.	Miles of Wires.	Number of Messages	Receipts.	Dividends paid.
				£. s. d.	
June, 1850 . . .	1,684	6,730	29,245	10,436 10 0	4 per Cent. per Ann.
December, 1850 . .	1,786	7,200	37,389	23,087 13 9	4 per Cent per Ann.
June, 1851 . . .	1,965	7,900	47,259	25,529 12 4	6 per Ct. per Ann. & 2 per Ct. Bonus.
December, 1851 . .	2,122	10,650	53,957	24,336 8 10	6 per Cent. per Ann.
Note.—In this half-year the paid-up Capital of the Company was increased, and the tariff diminished about 50 per Cent. from the original rate of charge.					
June, 1852 . . .	2,502	12,500	87,150	27,437 4 8	6 per Cent. per Ann.
December, 1852 . .	3,709	19,560	127,987	40,087 18 2	6½ per Cent. per Ann.
June, 1853 . . .	4,008	20,800	138,060	47,265 16 3	6¾ per Cent. per Ann.
December, 1853 . .	4,409	24,340	212,440	56,919 0 1	7 per Cent. per Ann.

It will be seen from the above what an impulse was given to the business by the reduction in the tariff which took place in December, 1851; for if we compare the messages of the half-year ending June, 1850, with those of the half-year of June, 1852, we shall find that whilst the miles of telegraph in work had not increased one-half, the messages transmitted had nearly trebled. It is only within this last year or two, however—as will be seen by the table—that a very large augmentation of business has taken place, which is doubtless owing to the public being better acquainted with its capabilities. The tariff has since been further reduced, with the result of a still further increase of the messages sent and of the money received—the profits allowing, at the present moment, of a seven per cent. dividend! The lowest point of cheapness, in our opinion, is yet very far from being reached; and it would only be a wise act on the part of the Company to at once adopt an uniform charge for messages, say of fifty words, for one shilling. If this were done, the only limit to its business would be the number of wires they could conveniently hang, for the present set would clearly be insufficient. Means should also be taken to obviate one great objection, at present felt, with respect to sending private communications by telegraph—the violation of all secrecy,—for in any case half a dozen people must be cog-

nizant of every word addressed by one person to another. The clerks of the English Electric Telegraph Company are sworn to secrecy, but we often write things that it would be intolerable to *see* strangers read before our eyes. This is a grievous fault in the telegraph, and it *must* be remedied by some means or other. Our own opinion is that the public would much prefer the dial telegraph, by the use of which two persons could converse with each other, without the intervention of a third party at all—or the printing step by step instrument would be equally good. At all events, some simple yet secure cipher, easily acquired and easily read, should be introduced, by which means messages might to all intents and purposes be "sealed" to any person except the recipient. We have reason to believe that Professor Wheatstone has invented a cipher of this description, which will speedily be made public. "One-eighth of the despatches between New Orleans and New York," says Mr. Jones in his "Historical Sketch of the Electric Telegraph," "are in cipher. For instance, merchants in either city agree upon a cipher, and if the New Orleans correspondent wishes to inform his New York friend of the prices and prospects of the cotton market, instead of saying 'Cotton eight quarter—don't sell,' he may use the following:—'Shepherd—rum—kiss—flash—dog.'"

The Company has lately made an arrangement, by which the very absurd and inconvenient necessity of being obliged to attend personally at the telegraph station with a message has been obviated. "Franked message papers," pre-paid, are now issued, procurable at any stationers'. These, with the message filled in, can be dispatched to the office when and how the sender likes, and the Company intend very quickly to sell electric stamps, like Queen's heads, which may be stuck on to any piece of paper, and frank its contents without further trouble. Another very important arrangement for mercantile men is the sending of "remittance messages," by means of which money can be paid in at the central office in London, and, within a few minutes, paid out at Liverpool or Manchester, or by the same means sent up to town with the like dispatch from

Liverpool, Manchester, Bristol, Birmingham, Leeds, Glasgow, Edinburgh, Newcastle-on-Tyne, Hull, York, Plymouth, and Exeter. There is a money-order office in the Lothbury establishment to manage this department, which will, no doubt, in all emergencies speedily supersede the Government money-order office, which works through the slower medium of the Post Office.

We have spoken hitherto only of the Old Electric Telegraph Company. There are several other companies in the United Kingdom, working different patents. We have chosen, however, to describe the proceedings of the original Company, because it is the only one that has an amount of business sufficient to give it universal interest; it is the only company, in fact, that has seized the map of England in its nervous grasp, and shot its wires through every broad English shire. The European and the British Telegraph Companies have laid their lines, insulated with gutta percha and protected by iron tubes, beneath the public roads. The European Company works between Manchester, Birmingham, London, and Dover, and, by means of the two submarine cables of Dover and Calais and Dover and Ostend, puts the great manufacturing and commercial emporiums in connection with France, Belgium, and the rest of Europe by a double route. The British Telegraph Company works principally in the northern counties. Of the other lines, we need only mention at present the United Kingdom, and the English and Irish Magnetic Company, which works wires between London, Belfast, and Galway, by means of a subterranean line as far as the west coast of Scotland, and of a submarine cable stretched between Portpatrick and Donaghadee.

It will, perhaps, be a source of wonder to our readers that one company should virtually possess the monopoly of telegraphic communication in this country, but this will cease when they consider that this Company was the first to enter the field, that it came forward with a large capital, speedily secured to themselves the different lines of railway—the only paths it was then considered that telegraphs could traverse

with security,—and that it bought up, one after another, most of the patents that stood any chance of competing with its own. The time is fast approaching, however, when most of these advantages will fail them, and when the Company, powerful as it is, must be prepared to encounter a severe and active competition, and that for the following reasons :—

1. The plan of bringing the wires under the public roads turns, as it were, the flank of the railroad lines.

2. The patents of the old company are year by year expiring.

3. The very large capital expended by it — upwards of 170,000*l.* being sunk in patent rights alone,—independently of the vast expense attaching to the first introduction of the invention, forms a dead-weight which no new company would have to bear.

In the ordinary course of events, then, the other lines at present in existence will gain strength ; new companies will spring up, and the supply of a great public want will be thrown into the arena of competition. Would it not be wise for the legislature to consider the question of telegraphy in England before it is too late? We all know what the principle of reckless competition led us into in our railway system. For years opposing companies scrambled for the monopoly of certain districts, and the result was the intersection of the country with bad lines, and, in many cases, with useless double routes. Millions were spent in litigation ; railway travelling became, as a natural consequence, dear ; the property of the original shareholders rapidly deteriorated ; and it has all ended in half a dozen powerful companies swallowing up the smaller ones ; and that competition, in whose name so much was demanded, has turned out to be only "a delusion and a snare." The conveyance of intelligence cannot safely and conveniently be left in the hands of even one company without a strict Government supervision ; much less can half a dozen systems be allowed to distract the land at their own will. Indeed, the question might with propriety be asked, Is not telegraphic communication as much a function of Government as the conveyance of

letters? If the do-nothing principle is to be allowed to take its course, we shall have to go through a similar state of things to that which occurred only a few years since in the United States, when different competing lines refused to forward each other's messages, and the whole system of telegraphic communication was accordingly dislocated. Indeed, even with the most perfect accord between different companies, the dissimilarity of instruments used by them would prove a great practical evil—as great a one, if not greater, than the break of gauge in the railway system. Messages could not be passed from one line to another, and delays as vexatious as those which occur on the continental lines would take away much of the value of the invention. It seems to us, then, that even if Parliament should refuse to interfere with the principle of competition in the case of the telegraphic communication, it should, at least, provide for the use of the same kind of instruments, and make it a fineable offence for one line to refuse to forward the messages of another.

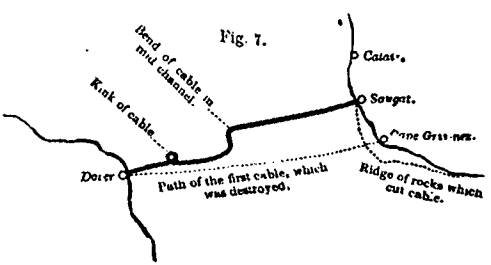
Having done so much towards completing our telegraphic organization at home, our engineers adventurously determined to carry the wires across to the continent, and thus destroy the last remnant of that isolation to which we were forced to submit on account of our insular position. As long back as the year 1840 we find, by the Minutes of Evidence in the Fifth Report upon Railways, wherein the subject of electric telegraphy was partially examined, that, whilst Mr. Wheatstone was under examination Sir John Guest asked, "Have you tried to pass the line through water?" to which he replied, "There would be no difficulty in doing so; but the experiment has not yet been tried." Again, on the chairman, Lord Seymour, asking, "Could you communicate from Dover to Calais in that way?" he replied, "I think it perfectly practicable." A couple of years later the professor, indeed, engaged, and had everything in readiness, to lay a line for the Government across Portsmouth Harbour; it was not executed, however, through circumstances over which he had no control, but which were quite irrespective of the perfect feasibility of the undertaking.

We question, however, whether it would have been possible to have accomplished the feat of crossing the Channel with the electric fire before this date, as the difficulty of insulating the wires, so as to prevent the water from carrying off the electricity, would, we imagine, have been insuperable, but for the happy discovery of gutta percha, which supplied the very tough, flexible, non-conducting material the electrician sought for. Thus it might be said that the instantaneous interchange of thought between distant nations awaited the discovery of a vegetable production in the dense forests of the Eastern Archipelago. The first application of this singular substance to the insulation of electric conducting wires was made in 1847, by Lieutenant Siémens, of the Prussian artillery, for a line to cross the Rhine at Cologne.

The first submarine wire laid down was that between Dover and Cape Gris-nez, in the vicinity of Calais, belonging to the Submarine Telegraph Company. This wire, thirty miles in length, was covered with gutta percha to the diameter of half an inch, and sunk (August, 1850), as it was paid out, by the addition of clumps of lead at every sixteenth of a mile. The whole was completed and a message sent between the two countries on the same day. In the course of a month, however, the cable broke, owing to its having fretted upon a sharp ridge of rocks about a mile from Cape Gris-nez. It was now determined to make a stronger and better-constructed cable, capable of resisting all friction in this part of the Channel. The form of cable adopted for this and all other submarine telegraphs now in existence seems to have been originally suggested by Messrs. Newall and Co., of Gateshead, the wellknown wire-rope manufacturers. Instead of one, four wires, insulated by the Gutta Percha Company, were twisted together into a strand, and next "served" or enveloped in spun-yarn. This core was then covered with ten iron galvanized wires five-sixteenths of an inch in diameter, welded into lengths of twenty-four miles, and forming a flexible kind of mail. The cable was manufactured in the short space of twenty-one days. It weighed 180 tons, and formed a coil in the hold of the old hulk that carried it of

thirty feet in diameter outside, and fifteen feet inside, standing five feet high. All went well with the undertaking until about one-half had been "paid out," when, a gale arising, unfortunately the tug-boat that towed the hulk containing the rope broke away, and vessel, wire, and all, drifted, with a racing tide, full a mile up the Channel before it could be overtaken. The consequence was, that the cable was violently dragged out of its course in the middle of the straits. What was worse, a sharp "kink," or bend, also occurred near the Dover shore, which doubled the cable on itself, but luckily produced no serious damage. The "lie" of the submarine cable between Dover and the vicinity of Calais, at this present moment, is expressed in the following diagram :—

Fig. 7.



When the cable at length came near the French coast, it was found to be, in consequence of this unintentional *detour*, at least half a mile too short. This was remedied, however, by splicing on a fresh piece; and, on securing it at Sangat, the new place of landing, fixed upon on account of its sandy shore, it was found that the communication was good, and good it has remained ever since—a proof of the admirable manner in which the wires were insulated and the cable constructed. The placing of this successful cable was superintended by Mr. Wollaston, the Company's engineer, and by Mr. Crampton, the contractor. Mr. Wollaston, who is a nephew of the illustrious philosopher of the same name, and who also presided over the earlier attempt, will accordingly, in the annals of electricity, carry off the honours of having first laid down the ocean telegraph.

The same Company, not long afterwards, laid another cable across to Ostend. This established a connection with Europe through Belgium, and was planned to prevent this line of communication falling into the hands of another company, and was not, as was suspected at the time, a matter of political foresight on the part of the directors, to enable them to carry on their intercourse with the continent, in spite of France, supposing war should break out between the two countries. Who would have believed a short time since, in Belgium, that the day would come when it would be quicker to convey intelligence to France by way of England than directly across the frontiers? Yet such was actually the case; for, before the line was laid by land, it was a thing of very frequent occurrence for despatches from Ostend to cross the Channel to Dover by one cable, and to be immediately switched across to Calais by the other; thus paying us a momentary triangular visit underneath the rapid straits.

The notion, however, of preventing competition proved to be vain. A third cable was laid on the 30th May, 1853, between the English coast at Orfordness, near Ipswich, and the port of Schevening in Holland, and thence to the Hague. This cable is the longest at present in connection with this isle, extending 120 miles under the turbulent North Sea. It was, however, paid out during a violent gale of wind without the slightest accident, and affords the most direct means of communication with the north of Europe, and entirely commands the commercial traffic of the cities of Amsterdam and Rotterdam. The Hague cable (or cables, for there are now many, consisting of a single wire conductor each, running side by side) is the property of the International Company, a branch of the Old Electric Telegraph, and its wires go direct to the Lothbury office.

Whilst England has moored her south-eastern shores to the continent by three cables, and put herself *en rapport* with all its principal cities, her north-western extremity has been secured, after many failures, to the sister kingdom—the Electro-Magnetic Company having laid a submarine wire from Portpatrick and Donaghadee, in the neighbourhood of Belfast, and the British Eletric Telegraph Company another between Portpatrick and

Whitehead in Belfast Lough. England, as befits her, led the way in these adventures upon the sea with the electric fire, and the Danes, Dutch, Russians, and others, are now following in her track.

Will it be believed that in 1841, long after the electric telegraph was working in England, scientific men were seriously discussing in the French Chamber the propriety of establishing a night telegraph on the visual principle, and that when at length it was determined to call in the aid of electricity, instruments were ordered to be so constructed that signals could be given after the fashion of the old semaphore, in order that the officials might be spared the trouble of leaving their ancient ruts? The needles were accordingly displaced for a mimic post, to which moveable arms were attached and signs were transmitted by elevating or depressing them by electricity, instead of by hand. Of course this absurd system was after a while abolished, and the instrument now made use of is a modification of the dial telegraph constructed by Breguet. The first telegraph planted in France was constructed by Mr. Wheatstone, from Paris to Versailles, in 1842. The principal line is that running from Calais *viâ* Paris to Marseilles, which puts the English Channel and the Mediterranean in communication, and transmits for us the more urgent items of the India and China mail.

Belgium and Switzerland are perhaps the best supplied of all the continental kingdoms with telegraphic communication. The Belgian lines were excellently planned and cheaply constructed, consequently their tariff is comparatively low, the average charge for a message being 3 francs 48 centimes, or about 2*s.* 10½*d.* Of the nature of the messages sent we can form a very good idea by the following classification of a hundred dispatches:—

Government	2
Stock-jobbing	50
Commercial	31
Newspaper	4
Family affairs	13
	100

A comparison of the average division of messages in every state would afford a very fair index of the nature of the occupations of their peoples. We have attempted to obtain materials for this purpose in vain; foreign governments, as well as English companies, being very jealous of giving any information relative to their messages. The history of the telegraph in Switzerland is an evidence of what patriotic feeling is capable of accomplishing. Although by far the best and most extensive, for a mountainous country, in the world, it was constructed by the spontaneous efforts of the people. The peasantry gave their free labour towards erecting the wires and poles, the landlords found the timber and gave the right of way over their lands, and the communes provided station room in the towns. Thus the telegraph was completed, so to speak, for nothing. The peculiarity of the Swiss telegraph is that, like the great wall of China, it proceeds totally regardless of the nature of the ground. It climbs the pass of the Simplon in proceeding from Geneva to Milan; it goes over St. Gothard in its way from Lucerne to Como: it mounts the Splugen, and again it goes from Feldkirch to Inspruck by the Arlberg pass, thus ascending the great chain of the Alps as though it were only a gentle hillside. The wires course along the lakes of Lucerne, Zug, Zurich, and Constance; sometimes they are nailed to precipices, sometimes they make short cuts over unfrequented spurs of the mountains, going every way, in short, that it is found most convenient to hang them. The completion of the telegraphic system of this little republic, which stands in the same relation to Southern as Belgium does to Northern Europe, was of great consequence, as it forms the keystone between France, Prussia, Austria, Piedmont, and Italy.

In Prussia the lines are insulated in gutta percha, and buried in the ground in leaden tubes, a very costly process, but with many great advantages, in freedom from injury and atmospheric influences, over the more usual method of suspending them in the air on poles. Upwards of 4,000 miles of wire have already been laid down in this kingdom. Although Austria only commenced operations in 1847, she already possesses 4,000 miles

of telegraph, which puts the greater part of her extensive empire in communication with Vienna.

Whatever injury the Eastern war might have inflicted upon the world, it at least infused fresh vigour into the telegraphic system, as, independently of the lines planned to put Constantinople in communication with the Danubian frontier, Russia has been stimulated to complete a line between St. Petersburg and Helsingfors, in the Baltic, and a continuation of the line already extending from the capital to Moscow, down to Bucharest, Odessa, and Sebastopol. One feature distinguishes the management of continental telegraphs over those of England and America: they are all, with the exception of the short line between Hamburg and Cuxhaven, possessed and worked by the different governments, who seem afraid of the use they might be put to for political purposes, and accordingly exercise a strict surveillance over all messages sent, and rigidly interdict the use of a cipher.* The Anglo-Saxon race, however, has far surpassed any other in the energy with which it has woven the globe with telegraphic wires. The Americans in the West and the British in the East alike emulate each other in the magnitude of their undertakings of this nature. The United States, although she came into the field long after England—her first line from Washington to Baltimore not having been completed until 1844—has far outstripped the mother country in the length of her lines, which already extend over 16,729 miles. Every portion of the Union, with the exception of California and the upper portion of the Mississippi, is covered with a network of wire.

New York and New Orleans communicate with each other by a double route—one skirting the seacoast, the other taking an inland direction by Cincinnati. These lines alone, following the sinuosities of their routes, are upwards of 2,000 miles in length.

* It may be as well to state that nearly all the continental telegraphs have formed themselves into a confederacy, called the Austro-Germanic Union, which includes the lines of Austria, Prussia, Saxony, Bavaria, Hanover, Würtemberg, the Netherlands, Denmark, and the Grand Duchy of Baden. The Union regulates the tariff and all questions relative to the working of the allied lines.

Other lines extend as far as Quebec, in Upper Canada, so that messages may be forwarded in the course of a couple of hours from the freezing north to the burning south. The great chain of lakes which form the northern boundary of the Union is put in communication with the Missouri and Mississippi rivers, and the great valley traversed by the latter will, ere long, interchange messages with the Pacific coast,—Congress having under its consideration a plan to establish a telegraph across the continent to San Francisco, as the precursor of the proposed railroad.

This we suspect is the project of Mr. O'Reilly, the engineer who has already executed the boldest lines in America. In constructing such a line, man, not nature, is the great obstacle to be encountered. The implacable Indians inhabiting this portion of the States certainly would not pay any respect to the telegraphic wire; on the contrary, they would in all likelihood take it to bind on the heads of their scalping tomahawks. To provide against this contingency, it is proposed to station parties of twenty dragoons at stockades twenty miles apart, along the whole unprotected portion of the route; two or three of these soldiers are also to ride from post to post and carry a daily express letter across the continent.

When this project is executed, it is asserted that "European news may be published in six days on the American shores of the Pacific, on the shortened route between the old and new world." "The shortened route," it should be mentioned, lies between Cape Race, in Newfoundland, and Galway, in Ireland, a passage calculated to take, on the average, only five days.

It may be asked how is it that such lengths of wire, carried through thinly settled parts of the country, and sometimes through howling wildernesses, can pay? The only manner that we can account for it is the cheapness with which the telegraph is built in America, the average price being 150 dollars, or about 31*l.* a mile—less than a fourth part of the cost at which the early lines of the English Electric Telegraph Company were erected. Again, the low prices charged for the transmission of messages produce an amount of business which

the lines running through thickly-inhabited England cannot boast. For instance, let us take the following advertised "specimen message," of the latter Company, and compare the price charged for it here, with what it could be sent for in America :—

"From James Smith, London, To S. R. Brown, Exchange, Liverpool.

"I will meet you at Birmingham to-morrow, 3 P.M. Don't fail me."

Now, the London charge for the above, if forwarded to Liverpool, would be 2s. 6d. ; but the American tariff for the same, on the Louisville and Pittsburgh rail, would be only one cent a word, or sixpence halfpenny English. On very long distances our friends on the other side of the steam ferry have a still greater advantage over us : for instance, a message of ten words can be sent on O'Reilly's line, from New York to New Orleans, a distance of 2,000 miles, for sixty cents, or two and sixpence—not half the sum it would cost to send the same message from London to Edinburgh, about 500 miles. We give, as a curiosity, the scale of prices on this line :*—

	Per word.
200 miles or under	1 cent.
500 ,, or over 300 miles	2 cents.
760 ,, ,, 500 ,,	3 ,,
1000 ,, ,, 700 ,,	4 ,,
1500 ,, ,, 1000 ,,	5 ,,
2000 ,, ,, 1500 ,,	6 ,,

These charges, it is true, are unusually low ; but if they will pay one Company, why should they not another ? There are as many as twenty Telegraph Companies in America, and consequently there is great competition, three or four competing lines in many cases running between the same towns. Great confusion has arisen from this competition, as we have before stated ; but it cannot be doubted that prices have materially fallen in consequence. It is common to send a message 1,000 miles in the United States without its being read and repeated

* See "Tariff of the Rates charged for general Dispatches on the Pittsburgh and Louisville Telegraph, Jones's Electric Telegraph, New York," p. 105.

at intermediate stations; and brother Jonathan boasts that he can communicate in fine weather instantaneously between New York and New Orleans. This, if done at all, must be at the expense of enormous battery power, as 2,000 miles of No. 8 wire would expose a conducting surface of no less than 450,000 square feet to the air. The wires in America are all suspended upon poles, and those passing through the southern pine forests are in consequence particularly liable to injury from the falling of trees, and watchers are posted at every twenty miles' distance to patrol the line. The telegraph is rarely seen in America running beside the railway, for what reason we do not know; the consequence, however, is, that locomotion in the United States is vastly more dangerous than with us. A comparison of the casualties occurring on railroads in the two countries, in the year 1852, will show this at a glance; for in the State of New York alone, during that year, 228 persons were killed out of 7,440,653 travellers, whilst during the same period only 216 people perished in Great Britain out of a total number of 89,135,729 passengers: thus the average in America was 1 killed in 286,179, and in Great Britain 1 in 2,785,491! Of course property suffers in an equal degree with life on the American lines. The people of Boston, on the recommendation of Dr. Channing, have constructed a municipal telegraph, the many uses of which will be obvious. Mr. Alexander Jones, in his historical sketch of the electric telegraph in America, gives the following account of the application of the electric wire in cases of fire :—

"A central office or station is fixed upon, at which the main battery, with other instruments, is placed. From this two circuit-wires proceed, like those of the common telegraph wires, fastened to housetops or ingeniously insulated supports. One of the wires communicates from the main fire bell-tower to all the others, and connects each with machinery, which puts in motion the largest-sized hammer, and causes it to strike a large fire-bell the desired number of blows; the other wire proceeds on a still more circuitous route, and from one local street or ward signal-station to another. Each station is provided with a strong box and hinged door and lock. Inside of this box there is a connecting electro-magnet and connecting lever, an axle with a number of pins in it to correspond to the number of the station. The axle is turned by a short crank, and in its revolutions the pins break and close the circuit, by moving the end of the lever as often as there are pins or cogs, the result of which is communicated

to the central station. If the alarm indicates a fire in the local district No. 3, the alarm can be instantly rung on all the bells in the city. If it is a subject requiring the speedy and efficient attention of the police, information by alarms can be given at each police-station, or the despatches can be recorded by instruments at each place. The local street alarm-boxes are placed in the charge of a person whose duty it is to give the alarm from the local to the central station, when called upon, or circumstances require him to do so."

Canada has also sketched out a plan of telegraphs, which every year will see filled up. Already she has lines connecting all her principal towns, and extending over nearly two thousand miles of country, all of which lock in with the American system.

In India, Dr. O'Shaughnessy has for some time been engaged in carrying out a telegraphic system proposed by Lord Dalhousie, and approved by the East India Company, which has already put all the important towns of the peninsula in communication with the seat of government and with each other. The fine No. 8 galvanized iron wire, which in Europe runs along from pole to pole, like a delicate harp-string, is discarded in this country for rods of iron three-eighths of an inch in thickness. The nature of the climate, and the character of its animal life, has caused this departure from the far more economical European plan. Clouds of kites and troops of monkeys would speedily take such liberties with the fine wires as to place them *hors-de-combat*. Again, the deluges of rain which occur in the wet season would render the insulation of a small wire so imperfect that a message could not be sent through it to any distance. The larger mass of metal, on the contrary, is capable of affording passage for the electric fluid through any amount of rain, without danger of "leakage;" and as for the kites and other large birds of the country, they may perch on these rods by thousands without stopping the messages, which will fly harmlessly through their claws; and the weight of the heaviest monkey is not sufficient to injure them. These rods are planted, without any insulation, upon the tops of bamboo poles (coated with tar and pitch), at such a height that loaded elephants can pass beneath without displacing them; and even if by chance they should be thrown down, bullock-carts or buffaloes and elephants may trample them under foot without doing them injury. In

some places the rods, if we are rightly informed, run through rice-swamps, buried in the ground, and even here the only insulating material used is a kind of cement made of rosin and sand. The telegraph, like a swift messenger, goes forward and prepares the way for the railroad, which is planned to follow in its footsteps. When these two systems are completed, the real consolidation of England's power in the East will have commenced, and the countless resources of the Indian peninsula will be called forth for the benefit of the conquered as well as of the conquering race.

The restless spirit of English engineers, having provided for the internal telegraphic communication of Great Britain and her principal dependencies, seems bent upon stretching out her lines to the East and to the West, so as ultimately to clasp the entire globe. The project of connecting, telegraphically, England with America is at the present moment seriously engaging the attention of scientific and commercial men. The more daring engineers are still sanguine of the practicability of laying a submarine cable directly across the Atlantic, from Galway to Cape Race in Newfoundland. Now that we have Lieutenant Maury's authentic determination of the existence of a shelf across the North Atlantic, the soundings on which are nowhere more than 1,500 fathoms, the feasibility of the project is tolerably certain. The principal question is, whether if a line were laid an electric current can be worked to commercial advantage through 3,000 miles of cable. No doubt, by the expenditure of enormous battery power, this might be accomplished through wires suspended in the air, but it is a question whether it can be done along a vast length of gutta-percha coated wire, passing through salt-water. There is such a thing as *too great an insulation*. Professor Faraday has shown that in such circumstances the wire becomes a Leyden jar, and may be so charged with electricity that a current cannot, without the greatest difficulty, move through it. This is the objection to a direct cable between the two continents: if, however, it can be overcome, doubtless the ocean path would in all possible cases be adopted where com-

munications had to be made between civilized countries having intermediate, barbarous, or ungenial lands. To escape this at present dubious ocean path, it is proposed to carry the cable from the northernmost point of the Highlands of Scotland to Iceland, by way of the Orkney, Shetland, and Ferroe islands—to lay it from Iceland across to the nearest point in Greenland, thence down the coast to Cape Farewell, where the cable would again take to the water, span Davis's Straits, and make right away across Labrador and Upper Canada to Quebec. Here it would lock in with the North American meshwork of wires, which hold themselves out like an open hand for the European grasp. This plan seems quite feasible, for in no part of the journey would the cable require to be more than 900 miles long; and as it seems pretty certain that a sandbank extends, with good soundings, all the way to Cape Farewell, there would be little difficulty in mooring the cable to a level and soft bottom. The only obstacle that we see is the strong partiality of the Esquimaux for old iron, and it would perhaps be tempting them too much to hang their coasts with this material, just ready to their hands. The want of settlements along this inhospitable arctic coast to protect the wire is, we confess, a great drawback to the scheme; but, we fancy, posts might be organized at comparatively a small cost, considering the magnitude and importance of the undertaking. The mere expense of making and laying the cable would not be much more than double that of building the new Westminster-bridge across the Thames.

Whilst England would thus grasp the West with one hand, her active children have plotted the seizure of the East with the other. A cable runs from Genoa to Corsica, and from thence to Sardinia. From the southernmost point of the latter island, Cape Spartivento, to the gulf of Tunis, another cable can easily be carried. The direction thence (after giving off a coast branch to Algeria) will be along the African shore, by Tripoli to Alexandria, and eventually across Arabia, along the coasts of Persia and Beloochistan until it enters Scinde, and finally joins the wire at Hydrabad, which in all pro-

bability by that time will have advanced from Burmah, across the Indian peninsula, to welcome it. America will shortly carry her line of telegraph to the Pacific shore, and run it up the coast as far as San Francisco. Can there be any reasonable doubt that, before the end of the century, the one line advancing towards the West and the other towards the East—through China and Siberia—will gradually approach each other so closely that a short cable stretched across Behring Straits will bring the four quarters of the globe within speaking distance of each other, and enable the electric fire to "put a girdle round the world in forty minutes?"

FIRES AND FIRE INSURANCE.

AMONG the more salient features of the metropolis which instantly strike the attention of the stranger are the stations of the Fire Brigade. Whenever he happens to pass them, he finds the sentinel on duty, he sees the "red artillery" of the force; and the polished axle, the gleaming branch, and the shining chain, testify to the beautiful condition of the instrument, ready for active service at a moment's notice. Ensconced in the shadow of the station, the liveried watchmen look like hunters waiting for their prey—nor does the hunter move quicker to his quarry at the rustle of a leaf, than the Firemen dash for the first ruddy glow in the sky. No sooner comes the alarm, than one sees with a shudder the rush of one of these engines through the crowded streets, the tearing horses covered with foam, the heavy vehicle swerving from side to side, and the black helmeted attendants swaying to and fro. The wonder is that horses or men ever get safely to their destination: the wonder is still greater that no one is ridden over in their furious drive.

Arrived at the place of action, the hunter's spirit which animates the fireman, and makes him attack an element as determinedly as he would a wild beast, becomes evident to the spectator. The scene which a London fire presents can never be forgotten: the shouts of the crowd as it opens to let the engines dart through it, the foaming head of water springing out of the ground, and spreading over the road until it becomes a broad mirror reflecting the glowing blaze—the black, snake-like coils of the leather hose rising and falling like things of

life, whilst a hundred arms work at the pump, their central heart, the applause that rings out clear above the roaring flame as the adventurous band throw the first hissing jet; cheer following cheer, as stream after stream shoots against the burning mass, now flying into the socket-holes of fire, set in the black face of the house-front, now dashing with a loud shir-r against the window-frame and wall, and falling off in broken showers. Suddenly there is a loud shrill cry, and the bank of human faces is upturned to where a shrieking wretch hangs frantically to an upper window-sill. A deafening shout goes forth, as the huge fire-escape comes full swing upon the scene: a moment's pause, and all is still, save the beat, beat, of the great water pulses, whilst every eye is strained towards the fluttering garments flapping against the wall. Will the ladder reach, and not dislodge those weary hands clutching so convulsively to the hot stone! Will the nimble figure gain the topmost rung ere nature fails? The blood in a thousand hearts runs cold, and then again break forth a thousand cheers to celebrate a daring rescue. Such scenes as this are of almost nightly occurrence in the great metropolis. A still more imposing yet dreadful sight is often exhibited in the conflagrations of those vast piles of buildings in the City filled with inflammable merchandise. Here the most powerful engines seem reduced to mere squirts; and the efforts of the adventurous brigade men are confined to keeping the mischief within its own bounds.

When we recollect that London presents an area of thirty-six square miles, covered with 21,600 square acres of bricks and mortar, and numbers more than 380,000 houses; that all the riches it contains are nightly threatened in every direction by an ever-present enemy; that the secret match, the spontaneous fire, and the hand of the drunkard, are busily at work; it is evident that nothing but a force the most disciplined, and implements the most effective, can be competent to cope with so sudden and persevering a foe.

As late as twenty-two years ago there was no proper fire police to protect the metropolis against what is commonly

called the "all-devouring element." There was, it is true, a force of 300 parochial engines set on foot by acts which were passed between the years 1768-74, acts which are still in existence; but these engines are under the superintendence of the beadles and parish engineers, who are not the most active of men or nimble of risers. It may easily be imagined, therefore, that the machines arrived a little too late; and, when brought into service, were often found to be out of working order. Hence their employment did not supersede the private engines kept by some of the insurance offices long prior to their existence. On the contrary, owing to the increase of business which took place about this time, the different companies thought it worth their while to strengthen their former establishments, and this process continued while the parochial engines, with a few honourable exceptions, were dropping into disuse.

About the year 1833 it became evident that much was lost, both to the public and to the insurance companies, by every engine acting on its own responsibility—a folly which is the cause of such jealousy among the firemen at Boston (United States), that rival engines have been known to stop on their way to a fire to exchange shots from revolvers. It was, therefore, determined to incorporate the divided force, and place it under the management of one superintendent, each office contributing towards its support, according to the amount of its business. All the old-established companies, with one exception,* shortly came into the arrangement, and Mr. Braidwood, the master of the fire-engines of Edinburgh, being invited to take the command, organized the now celebrated *London Fire Brigade.*

At the present moment, then, the protection against fire in London consists, firstly, in the three hundred and odd parish-engines (two to each parish), which are paid for out of the rates. The majority of these are very inefficient, not having

* The West of England Fire-Office, which retains the command of its own engines.

any persons appointed to work them who possess a competent knowledge of the service. Even women used now and then to fill the arduous post of director; and it is not long since a certain Mrs. Smith, a widow, might be seen at conflagrations, hurrying about in her pattens, directing the firemen of her engine, which belonged to the united parishes of St. Michael Royal and St. Martin Vintry, in the city. We question, indeed, if at the present moment any of the parish-engines are much better officered than in the days of widow Smith, with the exception of those of Hackney, Whitechapel, Islington, and perhaps two or three others. Secondly, there are an unknown number of private engines kept in public buildings and large manufactories, which sometimes do good service when they arrive early at small fires in their neighbourhood, although, singularly enough, when called upon to extinguish a conflagration in their own establishments, they generally "lose their heads," as the brigade men express it; and very many instances have occurred where even the parish-engines have arrived and set to work before the one on the premises could be brought to bear upon the fire. The cause is clear. The requisite coolness and method which every one can exercise so philosophically in other people's misfortunes utterly fail them when in trouble themselves. The doctor is wiser in his generation, and is never so foolish as to prescribe for himself, or to attend his own family.

Thirdly, we have, in contrast to the immense rabble of Bumble engines and the Bashi-Bazouks of private establishments, the small complement of men and material of the fire brigade. It consists of twenty-seven large horse-engines, capable of throwing eighty-eight gallons a minute to the height of from fifty to seventy feet, and nine smaller ones drawn by hand. To work them there are twelve engineers, seven sub-engineers, thirty-two senior firemen, thirty-nine junior firemen, and fourteen drivers, or 104 men and 31 horses. In addition to these persons, who form the main establishment, and live at the different stations, there is an extra staff of four firemen, four drivers, and eight horses. The members of this supplementary

force are also lodged at the stations,* as well as clothed, but are only paid when their services are required, and pursue in the daytime their ordinary occupations. This not very formidable army of 104 men and 31 horses, with its reserve of eight men and eight horses, is distributed throughout the metropolis, which is divided into four districts as follows:—On the north side of the river—1st, From the eastward to Paul's Chain, St. Paul's Churchyard, Aldersgate Street, and Goswell Street Road; 2nd, From St. Paul's, &c., to Tottenham Court Road, Crown Street, and St. Martin's Lane; 3rd, From Tottenham Court Road, &c., westward. 4th, The entire south side of the river. At the head of each district is a foreman, who never leaves it unless acting under the superior orders of Mr. Braidwood, the superintendent or general-in-chief, whose head-quarters are in Watling Street.

In comparison with the great continental cities, such a force seems truly insignificant. Paris, which does not cover a fifth part of the ground of London, and is not much more than a third as populous, boasts 800 *sapeurs-pompiers:* we make up, however, for want of numbers by activity. Again, our look-out is admirable: the 6,000 police of the metropolis, patrolling every alley and lane throughout its length and breadth, watch for a fire as terriers watch at rat-holes, and every man is stimulated by the knowledge, that if he is the first to give notice of

* The following are the stations:—

	No. of engines.
Watling Street (the principal station)	4
Wellclose Square	3
Farringdon Street	4
Chandos Street, Covent Garden	3
Schoolhouse Lane, Ratcliffe	1
Horseferry Road, Westminster	1
Waterloo Road	1
Paradise Row, Rotherhithe	1
Jeffrey Square, St. Mary-Axe	2
Whitecross Street	1
High Holborn, No. 254	2
Crown Street, Soho	2
Wells Street, Oxford Street	1
Baker Street, Portman Square	1
King Street, Golden Square	3
Southwark Bridge Road	3
Morgan's Lane, Tooley Street	1
Floating engine, off King's Stairs, Rotherhithe	1
„ off Southwark Bridge	1—36

it at any of the stations it is half a sovereign in his pocket. In addition to the police, there are the thousand eager eyes of the night cabmen, and the houseless poor. It is not at all uncommon for a cabman to earn four or five shillings of a night by driving fast to the different stations and giving the alarm, receiving a shilling from each for the "call."

In most continental cities a watchman takes his stand during the night on the topmost point of some high building, and gives notice by either blowing a horn, firing a gun, or ringing a bell. In Germany the quarter is indicated by holding out towards it a flag by day, and a lantern at night. It immediately suggests itself that a sentinel placed in the upper gallery of St. Paul's would have under his eye the whole metropolis, and could make known instantly, by means of an electric wire, the position of a fire, to the head-station at Watling Street, in the same manner as the Americans do in Boston. This plan is, however, open to the objection, that London is intersected by a sinuous river, which renders it difficult to tell on which bank the conflagration is raging. Nevertheless, we imagine that the northern part of the town could be advantageously superintended from such a height, whilst the southern half might rest under the surveillance of one of the tall shot-towers on that bank of the Thames. The bridges themselves have long been posts of observation, from which a large portion of the river-side property is watched. Not long ago there was a pieman on London Bridge, who eked out a precarious existence by keeping a good look-out up and down the stream.

Watling Street was chosen as the head-quarters of the Fire Brigade for a double reason: it is very nearly the centre of the City, being close to the far-famed London Stone, and it is in the very midst of what may be termed, speaking igneously, the most dangerous part of the metropolis—the Manchester warehouses. As the Fire Brigade is only a portion of a vast commercial operation—Fire Insurance—its actions are regulated by strictly commercial considerations. Where the largest amount of *insured* property lies, there its chief force is planted. It will, it is true, go any reasonable distance to put out a fire; but of course it pays most attention to property which its proprietors have

guaranteed. The central station receives the greatest number of "calls;" but as a commander-in-chief does not turn out for a skirmish of outposts, so Mr. Braidwood keeps himself ready for affairs of a more serious nature. When the summons is at night—there are sometimes as many as half a dozen—the fireman on duty below apprises the superintendent by means of a gutta percha speaking-tube, which comes up to his bedside. By the light of the ever-burning gas, he rapidly consults the "London Directory," and if the call should be to what is called "a greengrocer's street," or any of the small thoroughfares in by-parts of the town, he leaves the matter to the foreman in whose district it is, and goes to sleep again. If, however, the fire should be in the City, or in any of the great west-end thoroughfares, he hurries off on the first engine. Five minutes is considered a fair time for an engine "to horse and away," but it is often done in three. Celerity in bringing up aid is the great essential, as the first half hour generally determines the extent to which a conflagration will proceed. Hence the rewards of thirty shillings for the first, twenty for the second, and ten for the third engine that arrives, which premiums are paid by the parish. All the engines travel with as few hands as possible: the larger ones having an engineer, four firemen and a driver, and the following furniture:—

"Several lengths of scaling-ladder, each 6½ feet long, all of which may be readily connected, forming in a short space of time a ladder of any required length; a canvas sheet, with ten or twelve handles of rope round the edge of it for the purpose of a fire-escape; one 10-fathom and one 14-fathom piece of 2½-inch rope; six lengths of hose, each 40 feet long; two branch-pipes, one 2½ feet, and the other from 4 to 6 feet long, with one spare nose-pipe; two 6-feet lengths of suction-pipe, a flat rose, stand-cock, goose-neck, dam-board, boat-hook, saw, shovel, mattock, pole-axe, screw-wrench, crow-bar, portable cistern, two dog-tails, two balls of strips of sheepskin, two balls of small cord, instruments for opening the fire-plugs, and keys for turning the stop-cocks of the water-mains."

The weight of the whole, with the men, is not less than from 27 to 30 cwt., a load which in the excitement of the ride is carried by a couple of horses at the gallop.

The hands to work the pumps are always forthcoming on the spot at any hour of the night, not alone for goodwill, as every man—and there have been as many as five hundred employed

at a time—receives one shilling for the first hour and six-pence for every succeeding one, together with refreshments. In France the law empowers the firemen to seize upon the bystanders, and compel them to give their services, without fee or reward. An Englishman at Bordeaux, whilst looking on, some few years since, was forced, in spite of his remonstrances, to roll wine-casks for seven hours out of the vicinity of a conflagration. We need not say which plan answers best. A Frenchman runs away, as soon as the *sapeurs-pompiers* make their appearance upon the scene, to avoid being impressed. Still such is the excitement, that there are some gentlemen with us who pursue the occupation of firemen as amateurs; providing themselves with the regulation-dress of dark-green turned up with red, and with the accoutrements of the Brigade, and working, under the orders of Mr. Braidwood, as energetically as if they were earning their daily bread.

The fascination of fires even extends to the brute creation. Who has not heard of the dog "Chance," who first formed his acquaintance with the Brigade by following a fireman from a conflagration in Shoreditch to the central station at Watling Street? Here, after he had been petted for some little time by the men, his master came for him, and took him home; but he escaped on the first opportunity, and returned to the station. After he had been carried back for the third time, his master—like a mother whose son *will* go to sea—allowed him to have his own way, and for years he invariably accompanied the engine, now upon the machine, now under the horses' legs, and always, when going up-hill, running in advance, and announcing the welcome advent of the extinguisher by his bark. At the fire he used to amuse himself with pulling burning logs of wood out of the flames with his mouth. Although he had his legs broken half a dozen times, he remained faithful to his pursuit; till at last, having received a severer hurt than usual, he was being nursed by the fireman beside the hearth, when a "call" came, and at the well-known sound of the engine turning out, the poor brute made a last effort to climb upon it, and fell back dead in the attempt. He was stuffed and preserved at the station, and was doomed, even in death, to prove the fireman's

friend: for one of the engineers having committed suicide, the Brigade determined to raffle him for the benefit of the widow, *and such was his renown, that he realized* 123*l.* 10*s.* 9*d.*

The most interesting and practical part of our subject is the inquiry into the various causes of fires. Mr. Braidwood comes here to our aid with his invaluable yearly reports—the only materials we have, in fact, on which fire insurance can be built up into a science, a feat which we have not accomplished to nearly the same extent as with life assurance, although the Hand-in-Hand office was founded so far back as 1696. Thus we have the experience of upwards of 150 years, if we could only get at it, to enable the actuary to ascertain the doctrine of chances in this momentous subject, which at present is little better than a speculation. An analysis of the reports, from the organization of the Fire Brigade in 1833 to the close of 1853, a period extending over 21 years, affords the following result:

Abstract of List of Fires and Alarms for Twenty Years, ending 1853.

Year.	Totally Destroyed.	Considerably Damaged.	Slightly Damaged.	Total of Fires.	Alarms.			Total of Fires & Alarms.
					False.	Chimn'y	Total.	
1833	31	135	292	458	59	75	134	592
1834	28	116	338	482	57	112	169	651
1835	31	125	315	471	66	106	172	643
1836	33	134	397	564	66	126	192	756
1837	22	122	357	501	82	134	216	717
1838	33	152	383	568	79	108	187	755
1839	17	165	402	584	70	101	171	755
1840	26	204	451	681	84	98	182	863
1841	24	234	438	696	67	92	159	855
1842	24	224	521	769	61	82	143	912
1843	29	231	489	749	79	83	162	911
1844	23	237	502	762	70	94	164	926
1845	23	253	431	707	82	87	168	875
1846	25	233	576	834	119	69	188	1,022
1847	27	273	536	836	88	66	154	990
1848	27	269	509	805	120	86	206	1,011
1849	28	228	582	838	76	89	165	1,003
1850	18	229	621	868	91	79	170	1,038
1851	21	255	652	928	115	116	231	1,159
1852	25	238	660	923	93	89	182	1,105
1853	20	241	639	900	72	90	162	1,062
Total	535	4,298	10,091	14,924	1,695	1,982	3,677	18,601

If we examine this table, we find ample evidence that the organization of the Fire Brigade has resulted in an abatement of loss and labour. Taking the average of the last twenty-one years, there has been a decrease of 5·7 in the last year under the head of "totally destroyed." This is the best test of the activity of the Brigade, and really means much more than is obvious at first sight. Within these twenty-one years many tens of thousands of houses have been added to the metropolis; our periphery has been continually enlarging; like a tree, we grow year by year by adding a fresh ring of bricks and mortar. Whilst this increase is going on externally, the central part is growing too. We can afford no dead wood in our very heart: if it cannot expand one way it must another. Accordingly, we find the crowded city extending towards the sky; and if we take into account the immense mass of material added to that which existed, all of which is equally liable to the inroads of fire, we can understand why the total number of conflagrations has increased from 458 in 1833 to 900 in 1853. With such an augmentation of conflagrations, the *decrease* of houses totally destroyed in 1853 is the highest testimony to the ability and zeal of Mr. Braidwood.

The item "totally destroyed" is mainly made up of houses and factories in which are stored very combustible materials, such as carpenters' and cabinet-makers' shops, oilmen's warehouses, sawmills, &c., where the fire gains such a hold in a few minutes as to preclude the possibility of putting it out. The number is also swelled by houses which are situated many miles from the nearest station; for there are no stations in the outskirts of the town, and very few in the crowded suburbs. We have seen complaints of this want of help in thickly-populated localities; but the companies only plant an establishment where the insurances are sufficient to cover the expense, and people who do not contribute have no more right to expect private individuals to take care of their property than tradesmen in the Strand would have to expect the private watchman outside Messrs. Coutts' bank to look after their shutters. Indeed, it seems to us that the Brigade act very liberally. The firemen

never stop to ask whether the house is insured or not; nor are they deterred by distance; and in many cases they have gone as far as Brentford, Putney, Croydon, Barnet, Uxbridge, Cranfordbridge, Windsor Castle, and once to Dover by an express engine. The only difference made by the Brigade between insured and uninsured property is, that after putting out a fire they take charge of the salvage of the former, and leave that of the latter to its owner. The force is, however, very careful to repair immediately any damage they may have done to adjoining property—damage which they commit in the most deliberate manner, regardless of pains and penalties. For instance, *housebreaking* is almost a nightly crime with the firemen whilst in search of water, who never let a wall or a door stand between them and a supply of this element. It is a proof of the good feeling which prevails on such occasions that, although they are technically guilty of an offence which renders them liable to punishment, no one murmurs, much less threatens proceedings. If the authorities in the great fire of London had acted in a similar manner for the public good, they would have saved the half of the Inner Temple, which was destroyed because, according to Clarendon's account, all the lawyers were absent on circuit, and the constables did not dare to take the responsibility of breaking open their chamber doors!

It is a question whether government ought not to relieve the parish authorities from a duty which they cannot separately perform, and combine their engines into a metropolitan brigade; thus guarding the town from fire as they do from robbery by the police. If people will not protect themselves by insuring, the state should protect them, and make them pay for it. An excellent system prevails in most parts of Germany of levying a rate at the close of the year upon all the inhabitants, sufficient to cover the loss from fires during the past twelvemonth. As every householder has a pecuniary interest in the result, he keeps a bucket and belt, and sallies out to extinguish the conflagration in his neighbour's premises. If the rate were adopted in London, and the present enormous duty on insurances reduced, the

cost to each person would be hardly more pence than it is pounds at present to the provident few.

Mr. Samuel Brown, of the Institute of Actuaries, after analyzing the returns of Mr. Braidwood, as well as the reports in the *Mechanics' Magazine* by Mr. Baddeley, who has devoted much attention to the subject, drew up some tables of the times of the year and hours of the day at which fires are most frequent. It would naturally be supposed that the winter would show a vast preponderance over the summer months; but the difference is not so great as might be expected. December and January are very prolific of fires, as in these months large public buildings are heated by flues, stoves, and boilers; but the other months share mishaps of the kind pretty equally, with the exception that the hot and dry periods of summer and autumn are marked by the most destructive class of conflagrations, owing to the greater inflammability of the materials, than in the damper portions of the year. This, from the desiccating nature of the climate, is especially the case in Canada and the United States, and, coupled with the extensive use of wood in building, has a large influence in many parts of the continent. The following list of all the great fires which have taken place for the last hundred years will bear out our statement:—

Month.	Description of Property, &c.	Place.	Value of Property Destroyed.	Year.
Jan..	Webb's Sugar-house	Liverpool	£4,600	1829
	Lancelot's-hey	,, ...	198,000	1833
	Town-hall and Exchange....	,, ...	45,000	1795
	Caxton Printing Office	,, ...	..	1821
	Dublin & Co. Warehouse ..	,, ...	..	1834
	Suffolk Street	,, ...	40,000	1818
	Mile End	London	200,000	1834
	Royal Exchange	,, ...	..	1838
Feb..	York Minster	York	..	1829
	8 West-India Warehouses ..	London	300,000	1829
	House of Commons	Dublin	..	1792
	Argyle Rooms	London	..	1830
	Camberwell Church	,, ...	..	1841
	Custom House	,, ...	..	1814
	Hop Warehouse	Southwark....	..	1851

Month.	Description of Property, &c.	Place.	Value of Property Destroyed.	Year.
Feb. cont.	J. F. Pawson & Co.'s Warehouses	St. Paul's Churchyard	£40,000	1853
	Pickford's Wharf	London	..	1824
	Goree Warehouses	Liverpool	50,000	1846
March	New Orleans	United States	dr. 650,000	1853
	15,000 houses at Canton	China	..	1820
	13,000 houses	Peru	..	1799
	Manchester	England	..	1792
	Fawcett's Foundry	Liverpool	£41,000	1843
	Oil Street	,,	12,000	1844
	Apothecaries' Hall	,,	7,000	1844
	Sugar House, Harrington Street	,,	30,000	1830
April	1,000 Buildings	Pittsburg	dr. 1,400,000	1845
	Savannah	United States	dr. 300,000	1852
	Parkshead, Bacon Street	Liverpool	£36,000	1851
	Windsor Forest	England	..	1785
	Margetson's Tan Yard, Bermondsey	London	36,000	1852
	1,158 Buildings, Charleston	United States	..	1838
	Horsleydown	London	..	1780
May	Dockhead	London	..	1785
	Great Fire, 1,749 houses	Hamburgh	..	1842
	23 Steamboats at St. Louis	United States	dr. 600,000	1849
	15,000 Houses	Quebec	..	1845
	York Minster	York	..	1840
	Duke's Warehouses	Liverpool	..	1843
	Okell's Sugar-house	,,	..	1799
	Gibraltar Row	,,	..	1838
	Liver Mills	,,	£8,700	1841
	Billingsgate	London	..	1809
June	Rotherhithe	London	..	1765
	Copenhagen	Denmark	..	1759
	Montreal	Canada	dr. 1,000,000	1852
	St. John	Newfoundland	..	1846
	Louisville	United States	dr. 100,000	1853
	47 persons, Quebec Theatre	Canada	..	1846
	1,300 houses, Quebec	,,	..	1845
	Gutta Percha Co., Wharf Road	London	£23,000	1853
	Humphreys' Warehouse, Southwark	,,	100,000	1851
July	Hindon	Wiltshire	..	1754
	15,000 Houses	Constantinople	..	1756
	12,000 Houses	Montreal	..	1852

Month.	Description of Property, &c.	Place.	Value of Property Destroyed.	Year.
July cont.	300 Houses	Philadelphia	..	1850
	300 Buildings	North America	dr. 160,000	1846
	302 Stores	New York	dr. 1,200,000	1846
	Apothecaries' Hall	Liverpool	..	1845
	Glover's Warehouses	,,	£17,000	1851
	Dockyard	Portsmouth	..	1770
	Wapping	London	1,000,000	1794
	Ratcliffe Cross	,,	..	1794
	Varna	Turkey	..	1854
Aug.	Dublin	Ireland	..	1833
	Gravesend	England	60,000	1847
	Walker's Oil Mill	Dover	30,000	1853
	Falmouth Theatre	Falmouth	..	1792
	Buildings, Albany	United States	dr. 600,000	1849
	10,000 Houses	Constantinople	..	1782.
	Smithfield	London	£100,000	1822
	East Smithfield	,,	..	1840
	Bankside	,,	..	1814
	Gateshead	England	..	1854
Sept.	46 Buildings	New York	dr. 500,000	1839
	200 Houses, Brooklyn	,,	150,000	1848
	Scott, Russell, & Co., Ship Builders, Mill Wall	London	£80,000	1853
	St. Paul's Church, Covent Garden	,,	..	1795
	60 Houses Rotherhithe	,,	..	1791
	Astley's Amphitheatre	,,	..	1794
	Mark Lane	,,	150,000	1850
	Covent Garden Theatre	,,	..	1808
	Store Street and Tottenham Court Road	,,	..	1802
	Macfee's	Liverpool	40,000	1846
	Gorees	,,	400,000	1802
	Formby Street	,,	380,000	1842
	Cowdray House	Sussex	..	1793
Oct.	52 Buildings	Philadelphia	dr. 100,000	1839
	Grimsdell's Builders' Yard	Spitalfields	..	1852
	Withwith's Mills	Halifax	£35,000	1853
	Robert Street	North Liverp'l	150,000	1838
	Lancelot's-hey	Liverpool	80,000	1854
	Memel Great Fire	Prussia	..	1854
	London Wall	London	84,000	1849
	20 Houses, Rotherhithe	,,	..	1790
	Lancelot's-hey	Liverpool	30,000	1834
	Wapping	London	100,000	1828
	Houses of Parliament	,,	..	1834
	Pimlico	,,	..	1839

Month.	Description of Property, &c.	Place.	Value of Property Destroyed.	Year.
Nov.	Royal Palace	Lisbon	..	1794
	New York	United States	..	1835
	20 Houses, Shadwell	London	..	1796
	Aldersgate Street	„	£100,000	1783
	Cornhill	„	..	1765
	Liver Street	Liverpool	6,000	1829
	Wright & Aspinall, Oxford Street	London	50,000	1826
	Hill's Rice Mills	„	5,000	1848
Dec.	Dock Yard	Portsmouth	..	1776
	Patent Office and Post Office	Washington	..	1836
	600 Warehouses	New York	dr. 4,000,000	1835
	Fenwick Street	Liverpool	£36,000	1831
	Brancker's Sugar-house	„	34,000	1843

(*Extracted from the Royal Insurance Company's Almanack*, 1854.)

One reason, perhaps, why there is such a general average in the number of conflagrations throughout the year is, that the vast majority occur in factories and workshops where fire is used in summer as well as winter. This supposition appears at first sight to be contradicted by the fact that nearly as many fires occur on Sunday as on any other day of the week. But when it is remembered that in numerous establishments it is necessary to keep in the fires throughout that day, and as in the majority of cases a very inadequate watch is kept, it is at once apparent why there is no immunity from the scourge. Indeed, some of the most destructive fires have broken out on a Sunday night or on a Sunday morning; no doubt because a large body of fire had formed before it was detected. A certain number of accidents occur in summer in private houses from persons on hot nights opening the window behind the toilet-glass in their bedrooms, when the draught blows the blind against the candle. Swallows do not more certainly appear in June, than such mishaps are found reported at the sultry season.

If we watch still more narrowly the habits of fires, we find that they are active or dormant according to the time of day. Thus, during a period of nine years, the per-centage regularly increased from 1·96 at 9 o'clock A.M., the hour at which all

households might be considered to be about, to 3·34 at 1 P.M., 3·55 at 5 P.M., and 8·15 per cent. at 10 P.M., which is just the time at which a fire left to itself by the departure of the workmen would have had swing enough to become visible.

The origin of fires is now so narrowly inquired into by the officers of the Brigade, and by means of inquests, that we have been made acquainted with a vast number of curious causes, which would never have been suspected. From an analysis of fires which have occurred since the establishment of the Brigade we have constructed the following tables :—

Curtains	2,511	Smoking Tobacco	166
Candle	1,178	Smoking Ants	1
Flues	1,555	Smoking in Bed	2
Stoves	494	Reading in ditto	22
Gas	932	Sewing in ditto	4
Light dropped down Area	13	Sewing by Candle	1
Lighted Tobacco falling down ditto	7	Lime overheating	44
Dust falling on horizontal Flue	1	Waste ditto	43
Doubtful	76	Cargo of Lime ditto	2
Incendiarism	89	Rain slacking ditto	5
Carelessness	100	High Tide	1
Intoxication	80	Explosion	16
Dog	6	Spontaneous Combustion	43
Cat	19	Heat from Sun	8
Hunting Bugs	15	Lightning	8
Clothes-horse upset by Monkey	1	Carboy of Acid bursting	2
Lucifers	80	Drying Linen	1
Children playing with ditto	45	Shirts falling into Fire	6
Rat gnawing ditto	1	Lighting and Upsetting Naphtha Lamp	58
Jackdaw playing with ditto	1	Fire from Iron Kettle	1
Rat gnawing Gaspipe	1	Sealing Letter	1
Boys letting off Fireworks	14	Charcoal fire of a Suicide	1
Fireworks going off	63	Insanity	5
Children playing with Fire	45	Bleaching Nuts	7
Spark from ditto	243	Unknown	1,323
Spark from Railway	4		

Among the more common causes of fire (such as gas, candle, curtains taking fire, children playing with stoves, &c.) it is remarkable how uniformly the same numbers occur under each head from year to year. General laws obtain as much in small as in great events. We are informed by the Post Office authorities that about eight persons daily drop their letters into the post without directing them; we know that there is an unvary-

ing percentage of broken heads and limbs received into the hospitals; and here we see that a regular number of houses take fire, year by year, from the leaping out of a spark or the dropping of a smouldering pipe of tobacco. It may indeed be a long time before another conflagration will arise from "a monkey upsetting a clothes-horse," but we have no doubt such an accident will recur in its appointed cycle.

Although gas figures so largely as a cause of fire, it does not appear that its rapid introduction of late years into private houses has been attended with danger. There is another kind of light, however, which the insurance offices look upon with terror, especially those who make it their business to insure farm property. The assistant-secretary of one of the largest fire-offices, speaking broadly, informed us that the introduction of the lucifer-match *caused them an annual loss of ten thousand pounds!* In the foregoing list we see in how many ways they have given rise to fires.

Lucifers going off probably from heat . . .	80
Children playing with lucifers	45
Rat gnawing lucifers	1
Jackdaw playing with lucifers	1
	127

One hundred and twenty-seven known fires thus arise from this single cause; and no doubt many of the twenty-five fires ascribed to the agency of cats and dogs were owing to their having thrown down boxes of matches at night, which they frequently do, and which is almost certain to produce combustion. The item "rat gnawing lucifer," reminds us to give a warning against leaving about wax lucifers where there are either rats or mice, for these vermin constantly run away with them to their holes behind the inflammable canvas, and eat the wax until they reach the phosphorus, which is ignited by the friction of their teeth. Many fires are believed to have been produced by this singular circumstance. How much, again, must lucifers have contributed to swell the large class of conflagrations whose causes are unknown! Another cause of fire, which is of recent date, is the use of naphtha in lamps,—a most

ignitible fluid when mixed in certain proportions with common air. "A delightful novel" figures as a proximate, if not an immediate, cause of twenty-two fires. This might be expected; but what can be the meaning of a fire caused by a high tide? When we asked Mr. Braidwood the question, he answered, "Oh, we always look out for fires when there is a high tide. They arise from the heating of lime upon the addition of water." Thus rain, we see, has caused four conflagrations, and simple over-heating forty-four. The lime does no harm so long as it is merely in contact with wood; but if iron happens to be in juxtaposition with the two, it speedily becomes red-hot, and barges on the river have been sunk, by reason of their bolts and iron knees burning holes in their bottoms. Of the singular entry, "rat gnawing a gaspipe," the firemen state that it is common for rats to gnaw leaden service-pipes, for the purpose, it is supposed, of getting at the water, and in this instance the grey rodent laboured under a mistake, and let out the raw material of the opposite element. Intoxication is a fruitful cause of fires, especially in public-houses and inns.

It is commonly imagined that the introduction of hot water, hot air, and steam-pipes, as a means of heating buildings, cuts off one avenue of danger from fire. This is an error. Iron pipes, often heated up to 400°, are placed in close contact with floors and skirting-boards, supported by slight diagonal props of wood, which a much lower degree of heat will suffice to ignite. The circular rim supporting a still at the Apothecaries' Hall, which was used in the preparation of some medicament that required a temperature of only 300°, was found, not long ago, to have charred a circle, at least a quarter of an inch deep, in the wood beneath it, in less than six months. Mr. Braidwood, in his evidence before a Committee of the House of Lords, in 1846, stated that it was his belief that by long exposure to heat, not much exceeding that of boiling water, or 212°, timber is brought into such a condition that it will fire without the application of a light. The time during which this process of desiccation goes on, until it ends in spontaneous combustion, is, he thinks, from eight to ten years; *so that a*

fire might be hatching in a man's premises during the whole of his lease, without making any sign!

Mr. Hosking, in his very useful and sensible little "Guide to the proper Regulation of Buildings in Towns," quotes the following case, which completely confirms Mr. Braidwood's opinion, and explodes the idea that heat applied through the medium of pipes must be safe.

"Day and Martin's well-known blacking manufactory in High Holborn was heated by means of hot water passing through iron tubes into the various parts of the building. In December, 1848, the wooden casing and other woodwork about the upright main pipes were found to be on fire, and from no other cause that could be discovered than the constant exposure for a long time of the wood to heat from the pipes. In this case the pipes were not in contact with the wooden casing, but they were stayed and kept upright by cross fillets of wood, which touched them, and these it was which appeared to have taken fire. The small circulating pipes which conveyed the hot water throughout the several chambers were raised from the floor to about the extent of their own diameter, and the floors showed no signs of fire where the pipes were so removed; but in *every case* where the prop or saddle which held the pipe up from the floor had been displaced, and the pipe had been allowed to sag and touch the floor, *the boards were charred.* It was understood that the temperature of the water in the pipes never much exceeded 300°. The practical teaching of this case clearly is, that pipes should on no consideration be placed nearer to wood than the distance of their own diameters. Wood dried in the thorough manner we have mentioned is so liable to catch fire at the momentary propinquity of flame, that practical men imagine there must be an atmosphere of some kind surrounding it of a highly inflammable nature. In cases of pine wood we could well understand such a theory, as we know that a stick thrust into the fire will emit from its free end a volatile spirit of turpentine, which lights like a jet of gas.

"Mercers' Hall, burnt in 1853, was the victim of its hot-water pipes, which had not been in work more than four or five years. The vaulted room in the British Museum, which contains some of the Nineveh marbles, was fired—or rather the carpenters' work about—in a similar manner; and if report tells the truth, the new Houses of Parliament have been on fire several times already from a similar cause."

Under the heads "Incendiarism," "Doubtful," and "Unkown," are included all the cases of wilful firing. The return, "Incendiarism," is never made unless there has been a conviction, which rarely takes place, as the offices are only anxious to protect themselves against fraud, and do not like the trouble or bad odour of being prosecutors on public grounds. If the evidence of wilful firing, however, is conclusive, the insured, when he applies for his money, is significantly informed by the secretary that unless he leaves the office, *he will hang him.*

Though arson is no longer punished by death, the hint is usually taken. Now and then, such flagrant offenders are met with, that the office cannot avoid pursuing them with the utmost rigour of the law. Such, in 1851, was the case of a "respectable" solicitor, living in Lime-street, Watling-street, who had insured his house and furniture for a sum much larger than they were worth. The means he adopted for the commission of his crime without discovery were apparently sure; but it was the very pains he took to accomplish his end which led to his detection. He had specially made to order a deep tray of iron, in the centre of which was placed a socket. The tray he filled with naphtha, and in the socket he put a candle, the light of which was shaded by a funnel. The candle was one of the kind which he used for his gig-lamp,—for he kept a gig,—and was calculated to last a stated time before it reached the naphtha. He furtively deposited the whole machine in the cellar, within eight inches of the wooden floor, in a place constructed to conceal it. The attorney went out, and on coming back again found, as he expected, that his house was on fire. Unfortunately, however, for him—if it is ever a misfortune to a scoundrel to be detected,—it was put out at a very early stage, and the firemen, whilst in the act of extinguishing it, discovered this infernal machine. The order to make it was traced to the delinquent: a female servant, irritated at the idea of his having left her in the house to be burnt to death, gave evidence against him. He was tried and convicted, and is now expiating his crime at Norfolk Island. Plans for rebuilding this villain's house, and estimates of the expense, were found afterwards among his papers.

The class "doubtful" includes all those cases in which the offices have no moral doubt that the fire has been wilful, but are not in possession of legal evidence sufficient to substantiate a charge against the offender. In most of these instances, however, the insured has *his reasons* for taking a much smaller sum than he originally demanded. Lastly, we have the "unknown," to which 1,323 cases are put down, one of the largest numbers in the entire list, though decreasing year by year. Even of

these, a certain percentage are supposed to be wilful. There is no denying that the crime of arson owes its origin entirely to the introduction of fire insurance; and there can be as little doubt that, of late years, it has been very much increased by the pernicious competition for business among the younger offices, which leads them to deal too leniently with their customers; or, in other words, to pay the money, *and ask no questions.* It is calculated that *one fire in seven which occur among the small class of shopkeepers in London is an incendiary fire.* Mr. Braidwood, whose experience is larger than that of any person, tells us that the greatest ingenuity is sometimes exercised to deceive the officers of the insurance company as to the value of the insured stock. In one instance, when the Brigade had succeeded in extinguishing the fire, he discovered a string stretched across one of the rooms in the basement of the house, on which ringlets of shavings dipped in turpentine were tied at regular intervals. On extending his investigations, he ascertained that a vast pile of what he thought were pounds of moist sugar consisted of parcels of brown paper, and that the loaves of white sugar were made of plaster of Paris. Ten to one but the "artful dodge," which some scoundrel flatters himself is peculiarly his own, has been put in practice by hundreds of others before him. For this reason, fires that are wilful generally betray themselves to the practised eye of the Brigade. When an event of the kind "is going to happen" at home, a common circumstance is to find that the fond parent has treated the whole of his family to the theatre.

There is another class of incendiary fires which arise from a species of monomania in boys and girls. Not many years ago, the men of the Brigade were occupied for hours in putting out no less than half a dozen fires which broke out one after another in a house in West Smithfield; and it was at last discovered that they were occasioned by a youth who went about with lucifers and slily ignited everything that would burn. He was caught in the act of firing a curtain in the very room in which a fireman was occupied in putting out a blaze. A still more extraordinary case took place in the year 1848, at Torluck

House, in the Isle of Mull. On Sunday, the 11th of November, the curtains of a bed were ignited, as was supposed by lightning; a window-blind followed; and immediately afterwards the curtains of five rooms broke out one after another into a flame; even the towels hanging up in the kitchen were burnt. The next day a bed took fire, and it being thought advisable to carry the bed-linen into the coach-house for safety, it caught fire three or four times during the process of removal. In a few days the phenomenon was renewed. The furniture, books, and everything else of an inflammable nature, were, with much labour, taken from the mansion, and again some body-linen burst into a flame on the way. Even after these precautions had been taken, and persons had been set to watch in every part of the house, the mysterious fires continued to haunt it until the 22nd of February, 1849. It was suspected from the first that they were the act of an incendiary, and upon a rigid examination of the household before the Fiscal-General and the Sheriff, the mischief was traced to the daughter of the housekeeper, a young girl, who was on a visit to her mother. She had effected her purpose, which was perfectly motiveless, by concealing combustibles in different parts of the house.

The most ludicrous conflagration that perhaps ever occurred was that at Mr. Phillips's workshops, when the whole of his stock of instruments for extinguishing flame were at one fell swoop destroyed. "'Tis rare to see the engineer hoist with his own petard," says the poet; and certainly it was a most laughable *contre-temps* to see the fire-engines arrive at the manufactory just in time to witness the fire-annihilators annihilated by the fire. A similar mishap occurred to these unfortunate implements at Paris. In juxtaposition with this case, we are tempted to put another, in which the attempt at extinction was followed by exactly the opposite effects. A tradesman was about to light his gas, when, finding the cock stiff, he took a candle to see what was the matter; whilst attempting to turn it, the screw came out, and with it a jet of gas, which was instantly fired by the candle. The blaze igniting the shop, a passer-by seized a wooden pail and threw its contents upon the

flames, which flared up immediately with tenfold power. It is scarcely necessary to state that the water was whisky, and that the country was Old Ireland.

Spontaneous combustion is at present very little understood, though chemists have of late turned their attention to the subject. It forms, however, no inconsiderable item in the list of causes of fires. There can be no question that many of those that occur at railway stations and buildings are due to the fermentation which arises among oiled rags. Over-heating of waste, which includes shoddy, sawdust, cotton, &c., is a fearful source of conflagrations. The cause of most fires which have arisen from spontaneous combustion is lost in the consequence. Cases now and then occur where the firemen have been able to detect it, as, for instance, at Hibernia Wharf in 1846, one of Alderman Humphery's warehouses. It happened that a porter had swept the sawdust from the floor into a heap, upon which a broken flask of olive-oil that was placed above dripped its contents. To these elements of combustion the sun added its power, and sixteen hours afterwards the fire broke out. Happily, it was instantly extinguished; and the agents that produced it were caught, red-handed as it were, in the act. The chances are that such a particular combination of circumstances might not occur again in a thousand years. The sawdust will not be swept again into such a position under the oil, or the bottle will not break over the sawdust, or the sun will not shine in on them to complete the fatal sum. It is an important fact, however, to know that oiled sawdust, warmed by the sun, will fire in sixteen hours, as it accounts for a number of conflagrations in saw-mills, which never could be traced to any probable cause.

By means of direct experiment we are also learning something on the question of explosions. It used to be assumed that gunpowder was answerable for all such terrible effects in warehouses where no gas or steam was employed; and as policies are vitiated by the fact of its presence, unless declared, many squabbles have ensued between insurers and insured upon this head alone. At the late great fire at Gateshead, a report

having spread that the awful explosion which did so much damage arose from the illicit stowage of seven tons of gunpowder in the Messrs. Sisson's warehouse, the interested insurance companies offered a reward of 100*l.* to elicit information. The experiments instituted, however, by Mr. Pattinson, in the presence of Captain Du Cane, of the Royal Engineers, and the coroner's jury impanelled to inquire into the matter, showed that the water from the fire-engine falling upon the mineral and chemical substances in store, was sufficient to account for the result. The following were the experiments tried at Mr. Pattinson's works at Felling, about three miles from Gateshead :—

"Mr. Pattinson first caused a metal pot to be inserted in the ground until its top was level with the surface ; and having put into it 9 lbs. of nitrate of soda and 6 lbs. of sulphur, he ignited the mass ; and then, heating it to the highest possible degree of which it was susceptible, he poured into it about a quart of water. The effect was an immediate explosion (accompanied by a loud clap), which would have been exceedingly perilous to any person in its immediate vicinity. The experiment was next made under different conditions. The pot into which the sulphur and nitrate of soda were put was covered over the top with a large piece of thick metal of considerable weight ; and above that again were placed several large pieces of clay and earth. It was deemed necessary to try this experiment in an open field, away from any dwelling-house, and which admitted of the spectators placing themselves at a safe distance from the spot. The materials were then ignited as before ; and when in the incandescent state, water was poured upon the mass down a spout. The result was but a comparatively slight explosion, and which scarcely disturbed the iron and clods placed over the mouth of the vessel. Another experiment of the kind was made with the same result. At length, a trial having been made for the third time, but with this difference, that the vessel was covered over the top with another similar vessel, and that the water was poured upon the burning sulphur and nitrate of soda with greater rapidity than before, by slightly elevating the spout, the effect was to blow up the pot on the top into the air to a height of upwards of seventy feet, accompanied by a loud detonation. With this the coroner and jury became convinced that, whether or not the premises in Hillgate contained gunpowder, they contained elements as certainly explosive, and perhaps far more destructive."

We may here mention, as a curious result of the Gâteshead fire, that several tons of lead, whilst flowing in a molten state, came in contact with a quantity of volatilized sulphur. Thus the lead became re-converted into lead-ore, or a sulphuret of lead, which, as it required to be re-smelted, was thereby

debased in value from some twenty-two to fifteen shillings a ton.

The great fire, again, which occurred in Liverpool in October last, was occasioned by the explosion of spirits of turpentine, which blew out, one after another, seven of the walls of the vaults underneath the warehouse, and in some cases destroyed the vaulting itself, and exposed to the flames the stores of cotton above. Surely some law is called for to prevent the juxtaposition of such inflammable materials. The turpentine is said to have been fired by a workman who snuffed the candle with his fingers, and accidentally threw the snuff down the bunghole of one of the barrels of turpentine. The warehouses burnt were built upon Mr. Fairbairn's new fireproof plan, which the Liverpool people introduced some years ago, at a great expense to the town.

Water alone brought into sudden contact with red-hot iron is capable of giving rise to a gas of the most destructive nature —witness the extraordinary explosions that are continually taking place in steam-vessels, especially in America, which mostly arise from the lurching of the vessel when waiting for passengers, causing the water to withdraw from one side of the boiler, which rapidly becomes red hot. The next lurch in an opposite direction precipitates the water upon the highly-heated surface, and thus the explosive gas, in addition to the steam, is generated faster than the safety-valves can get rid of it.

A very interesting inquiry, and one of vital importance to the actuaries of fire-insurance companies, is the relative liability to fire of different classes of occupations and residences. We already know accurately the number of fires which occur yearly in every trade and kind of occupation. What we do not know, and what we want to know, is the proportion the tenements in which such trades and occupations are carried on, bear to the total number of houses in the metropolis. The last census gives us no information of this kind, and we trust the omission will be supplied the next time it is taken. According to Mr. Braidwood's returns, for the last twenty-one years, the number of fires in each trade, and in private houses, has been as follows :—

Private Houses	4,638
Lodgings	1,304
Victuallers	715
Sale-shops and Offices	701
Carpenters and Workers in Wood	621
Drapers, of Woollen and Linen	372
Bakers	311
Stables	277
Cabinet-makers	233
Oil and Colour-men	230
Chandlers	178
Grocers	162
Tinmen, Braziers, and Smiths	158
Houses under Repair and Building	150
Beershops	142
Coffee-shops and Chophouses	139
Brokers and Dealers in Old Clothes	134
Hatmakers	127
Lucifer-match makers	120
Wine and Spirit Merchants	118
Tailors	113
Hotels and Club-houses	107
Tobacconists	105
Eating-houses	104
Booksellers and Binders	103
Ships	102
Printers and Engravers	102
Builders	91
Houses unoccupied	89
Tallow-chandlers	87
Marine Store Dealers	75
Saw-mills	67
Firework-makers	66
Warehouses	63
Chemists	62
Coachmakers	50
Warehouses (Manchester)	49
Public Buildings	46

If we look at the mere number of fires, irrespective of the size of the industrial group upon which they committed their ravages, houses would appear to be hazardous according to the order in which we have placed them. Now, this is manifestly absurd, inasmuch as private houses stand at the head of the list, and it is well known that they are the safest from fire of all kinds of tenements. Mr. Brown, of the Society of Actuaries, who has taken the trouble to compare the number of fires in each industrial group, with the number of houses devoted to it, as far as he could find any data in the Post-office Directory, gives the following average annual percentage of conflagrations, calculated on a period of fifteen years :—

Lucifer-match makers	30·00
Lodging-houses	16·51
Hatmakers	7·74
Chandlers	3·88
Drapers	2·67
Tinmen, Braziers, and Smiths	2·42
Carpenters	2·27
Cabinet-makers	2·12
Oil and Colour-men	1·56
Beershops	1·31
Booksellers	1·18
Coffee-shops and Coffee-houses	1·2
Cabinet-makers	1·12
Licensed Victuallers	·86
Bakers	·75
Wine Merchants	·61
Grocers	·34

It will be seen that this estimate in a great measure inverts the order of "dangerous," as we have ranged them in the previous table, making those which from their aggregate number

seemed to be the most hazardous trades, appear the least so, and *vice versâ*. Thus lucifer-match makers have a bad pre-eminence; indeed they are supposed to be subject to a conflagration every third year; while the terrible victuallers, carpenters, mercers, and bakers, at the top of the column, shrink to the bottom of the list. These conclusions, nevertheless, are only an approximation to the truth, since it is impossible to procure a correct return of the houses occupied by different trades. Even if a certain class of tenements is particularly liable to fire, it does not follow that it will be held to be very hazardous to the insurers. Such considerations are influenced by another question,—Are the contents of houses forming the group, of that nature that, in cases of their taking fire, they are likely to be totally destroyed, seriously, or only slightly damaged? For instance, lodging-houses are very liable to fire; but they are very seldom burnt down or much injured. Out of 81 that suffered in 1853, not one was totally destroyed; only 4 were extensively affected; the very large majority, 77, were slightly scathed from the burning of window and bed curtains, &c. Among the trades which are too hazardous to be insured at any price are—we quote from the tariff of the County Fire-office—floor-cloth manufacturers, gunpowder dealers, hatters' "stock in the stove," lampblack makers, lucifer-match makers, varnish makers, and wadding manufacturers; whilst the following are considered highly hazardous;—bone-crushers, coffee-roasters, composition-ornament makers, curriers, dyers, feather-stovers, flambeau makers, heckling-houses, hemp and flax dressers, ivory-black makers, japanners and japan makers, laboratory-chemists, patent japan-leather manufacturers, lint-mills, rough-fat melters, musical-instrument makers, oil and colour men, leather dressers, oiled-silk and linen makers, oil of vitriol manufacturers, pitch makers, rag dealers, resin dealers, saw-mills, seed crushers, ship-buiscuit bakers, soap makers, spermaceti and wax refiners, sugar refiners, tar dealers and boilers, thatched houses in towns, and turpentine makers.

The great mass of these trades bear "hazardous" upon the very face of them; but it is not equally apparent why that of

a hatter should be so very dangerous, and particular portions of his stock uninsurable. We are given to understand that the stoves at which their manufacture is carried on, and the shellac and willow, are the causes of this proneness to conflagrations. The memorable fire at Fenning's Wharf, which burnt with a fury to which that at the Royal Exchange and at the Houses of Parliament was a mere bonfire, originated at a hatter's on London Bridge, from which place it speedily spread to Alderman Humphery's warehouses in the rear, leaped across Tooley Street—at this spot 60 feet wide—and thus invaded the great river-side wharf. The two floating-engines belonging to the brigade were brought into service on the occasion, and although they threw between them fourteen hundred gallons of water a minute to the height of a hundred feet, they had not the slightest effect upon the burning mass.

Nothing shows better the relative degrees of hazard than the different rates charged for insurance. Thus an ordinary dwelling-house pays but 1*s.* 6*d.* per cent., while a sugar-refinery pays at least two, and sometimes three guineas per cent., or from 30 to 40 times as much. The same class of houses pay different rates according to their locality. The residence which is charged 1*s.* 6*d.* in London, is, in St. John's, Newfoundland—a town famous, or rather infamous, for fires—charged by our English offices 1*l.* 11*s.* 6*d.* per cent. Probably the heaviest loss the Phœnix Office ever sustained was by the fire of St. John's, in 1846.

It is a notable fact, that the city of London, which is perhaps the most densely inhabited spot the world has ever seen, has long been exempt from conflagrations involving a considerable number of houses. "The devouring element," it is true, has made many meals from time to time of huge warehouses and public buildings; but since the great fire of 1666 it has ceased to gorge upon whole quarters of the town. We have never had, since that memorable occasion, to record the destruction of a thousand houses at a time, a matter of frequent occurrence in the United States and Canada—indeed in all parts of Continental Europe. The fires which have proved fatal to large

plots of buildings in the metropolis have in every instance taken place without the sound of Bow bells. A comparison between the number of fires which occurred between the years 1838 and 1843, in 20,000 houses situate on either side of the Thames, shows at once the superior safety of its northern bank, the annual average of fires on the latter being only 20 against 36 on the southern side. For this exemption we have to thank the great disaster, if we might so term what has turned out a blessing. At one fell swoop it cleared the city, and swept away for ever the dangerous congregation of wooden buildings and narrow streets which were always affording material for the flame.

Mr. Peter Cunningham, in his "Handbook of London,"* gives the following curious information respecting its supposed origin :—

"The fire of London, commonly called the Great Fire, commenced on the east side of this lane (Pudding-lane) about one or two in the morning of Sunday, September 2nd, 1666, in the house of Farryner, the king's baker.

"It was the fashion of the true blue Protestants of the period to attribute the fire to the Roman Catholics; and when, in 1681, Oates and his plot strengthened this belief, the following inscription was affixed on the front of this house (No. 25, I believe), erected on the site of Farryner, the baker's :—

"'Here, by the permission of Heaven, hell broke loose upon this Protestant city, from the malicious hearts of barbarous priests, by the hand of their agent, Hubert, who confessed, and on the ruins of this place declared the fact for which he was hanged, viz., that here began that dreadful fire which is described on and perpetuated by the neigbouring pillar, erected anno 1681, in the mayoralty of Sir Peter Ward, knight.'

"This celebrated inscription, set up pursuant to an order of the Court of Common Council, June 17th, 1681, was removed in the reign of James II., replaced in the reign of William III., and finally taken down 'on account of the stoppage of passengers to read it.' Entick, who makes addition to Maitland in 1756, speaks of it 'as lately taken away.' The house was 'rebuilt in a very handsome manner.'

"The inscribed stone is still preserved, it is said, in a cellar in Pudding-lane. Hubert was a French papist, of six-and-twenty years of age, the son of a watchmaker at Rouen, in Normandy. He was seized in Essex, confessed he began the fire, and, persisting in his confession, was hanged, upon no other evidence than his own. He stated in his examination that he had been 'suborned in Paris to this action,' and that three more 'combined to

* Repeated reference to this valuable work has more than confirmed the opinion we originally expressed of it. There are few books of greater utility than what is in fact a "History of London, Past and Present."

do the same thing. They asked him if he knew the place where he first put fire. He answered he knew it very well, and would show it to anybody.' He was then ordered to be blindfolded, and carried to several places of the City, that he might point out the house. They first led him to a place at some distance from it, opened his eyes, and asked him if that was it; to which he answered, 'No, it was nearer the Thames.' 'The house and all which were near it,' says Clarendon, 'were so covered and buried in ruins, that the owners themselves, without some infallible mark, could very hardly have said where their own house had stood; but this man led them directly to the place, described how it stood, the shape of the little yard, the fashion of the doors and windows, and where he first put the fire; and all this with such exactness, that they who had dwelt long near it could not so perfectly have described all particulars.' Tillotson told Burnet that Howell (the then Recorder of London) accompanied Hubert on this occasion, 'was with him and had much discourse with him, and that he concluded it was impossible it could be a melancholy dream.' This, however, was not the opinion of the judges who tried him. 'Neither the judges,' says Clarendon, 'nor any present at the trial, did believe him guilty, but that he was a poor distracted wretch, weary of his life, and chose to part with it in this way.' We may attribute the fire with safety to another cause than a Roman conspiracy. We are to remember that the flames originated in the house of a baker; that the season had been unusually dry; that the houses were of wood, overhanging the road-way (penthouses they were called), so that the lane was even narrower than it is now, and that a strong east wind was blowing at the time. It was thought very little of at first. Pepys put out his head from his bedroom window in Seething-lane, a few hours after it broke out, and returned to bed again, as if it were nothing more than an ordinary fire, a common occurrence, and likely to be soon subdued. The Lord Mayor (Sir Thomas Bludworth) seems to have thought as little of it till it was too late. People appear to have been paralyzed, and no attempt of any consequence was made to check its progress. For four successive days it raged and gained ground, leaping after a prodigious manner from house to house and street to street, at great distances from one another. Houses were at length pulled down, and the flames, still spreading westward, were at length stopped at the Temple Church in Fleet-street, and Pie-Corner in Smithfield. In these four days 13,200 houses, 400 streets, and 89 churches, including the cathedral church of St. Paul, were destroyed, and London lay literally in ruins. The loss was so enormous, that we may be said still to suffer from its effects. Yet the advantages were not few. London was freed from the plague ever after; and we owe St. Paul's, St. Bride's, St. Stephen's Walbrook, and all the architectural glories of Sir Christopher Wren, to the desolation it occasioned."

In addition to these advantages we acquired another, that of PARTY-WALLS—a safeguard which has prevented fires from spreading in the City, when whole streets have been swept away in a few hours in other parts of the metropolis, and especially in what might be termed the water-side suburbs of London—Rotherhithe, Greenwich, and Gravesend. The Act by which party-walls were enforced came into operation immediately prior to the rebuilding of the town, and has been rendered more

stringent and effective from time to time by various amendments. The Building Act of the 7th and 8th of Queen Victoria contains the important enactment, that "no warehouse shall exceed 200,000 cubic feet in contents." Fire becomes unmanageable when it has access to large stores of combustible matter; under such conditions it acquires a "fortified position," and cannot, in the vast majority of cases, be reduced unless by an early surprise.

As the very heart of London is largely occupied with Manchester warehouses full of the most inflammable materials, the safety of the capital depends upon this restrictive law. The Manchester warehousemen, nevertheless, have managed to set that part of the Act at defiance. Let us take, as the latest and most flagrant example, Cook's warehouses. This structure, which within these last two years has raised its enormous bulk in St. Paul's Churchyard, and actually dwarfed the metropolitan cathedral by the propinquity of its monotonous mass, contains 1,100,000 cubic feet of space open from end to end, or *nine hundred thousand feet more than it is entitled to possess.* If we were to take twenty-five ordinary-sized dwelling-houses, and pull down their party-walls, we should have just the state of things which is here presented to us. But it will be asked, if it is against the law, why do not the proper officers interfere? Where are the City surveyors? The reason, good reader, is this: the Manchester warehousemen of late years have adopted a new reading of the law—a reading which we believe no judge would allow, but which the surveyors have not yet ventured to dispute. "We escape altogether," say these gentlemen, "the provisions of the Building Act relative to warehouses, as, by reason of our breaking bulk, our places of business are not mere storehouses." That this reading is a violation of the spirit of the statute there can be no doubt; that it is also a violation of its letter we also believe; if not, it is high time that the law be amended upon this point; for we affirm, on the very best authority, that London has never since the great fire been in such danger of an overwhelming conflagration as it is now by the presence and rapid spreading of these huge warehouses, filled with the elements of destruction, and placed side

by side, as though for the very purpose of producing the utmost mischief by contagion.

Let us suppose, for instance, that a fire had once established itself in Cook's warehouses; to extinguish it would be out of the question. Fire-engines would be perfectly useless against a body of flame which would speedily become like a blast-furnace, and burn with a white heat. Who knows what would come after? Supposing the wind to be blowing from the south, we tremble for the cathedral. The huge dome is constructed entirely of oak, dried by the seasoning of 150 years, and the combustible framework is only lined on the exterior by sheet lead. It may be imagined that this would be protection enough against the enormous masses of burning cotton and linen cloth which would speedily be blown upon it; but Mr. Cottam not long since stated, at the Institution of Civil Engineers, that, "when the Princess's Theatre was on fire, part of his premises also caught. On examination, he found that it arose from a piece of blazing wood being thrown over from the theatre, which, falling into the leaden gutter, had melted it, and the liquid metal passed through the ceiling on to a workman's bench, where there was some oil, which it immediately set fire to." The great dome would be in quite as much danger as Mr. Cottam's workshop. Engines would be useless at such a height even as the stone gallery, the place where large bodies of burning material would most likely make a lodgment. Irreparable as would be the disaster with which we are threatened in this direction, one quite as great lies in another. Eastward of Cook's warehouses, and in the neighbourhood of a vitriol or some other chemical manufactory, is situated Doctors' Commons, the repository of the great mass of English wills. The roofs of this pile of buildings* are continuous; the buildings themselves are nearly as dry as the law itself. If one portion of the structure were to catch fire, nothing could save the whole from destruction. It may be urged that the block of buildings, which commands, like

* The roof of the pile of buildings composing Somerset-House is also continuous, thereby greatly increasing the risk of the entire building, if one portion of it were to catch.

a battery, two such important points in the metropolis, is, after all, fire-proof, and, as far as danger from without is concerned, this is true enough; but as cotton bales are not fire-proof, it is an impossibility to insure safety from within. Iron columns in such instances melt before the white heat like sticks of sealing-wax; stone flies into a thousand pieces with the celerity of a Prince Rupert's drop; slate becomes transformed into a pumice light enough to float upon water; the iron girders and beams, by reason of their lateral expansion, thrust out the walls; and the very elements, which seem calculated under ordinary circumstances to give an almost exhaustless durability to the structure, produce its most rapid destruction. The great fire at Messrs. Cubitt's so-called fire-proof works at Pimlico is one of the latest proofs we have had of the entire fallacy of supposing stone and iron can withstand the action of a large body of fierce flame. We saw the other day portions of columns from this building fused as though they had been composed of so much pewter. Again, when the Armoury of the Tower was destroyed, the barrels of the muskets were found reduced to the most fantastic shapes, and some of the largest pieces of ordnance were doubled up. A stronger instance still was exhibited at Davis's wharf in 1837, when a cast-iron pipe outside the building was melted like an icicle. But such a fierce furnace is not at all necessary to destroy cast-iron supports, as it appears from the experiments of Mr. Fairbairn, that, at a temperature of 600° the cohesive power of the metal rapidly decreases with every increment of heat. Mr. Braidwood, in his paper on fire-proof buildings, read before the Institute of Civil Engineers on February 29th, 1849, was the first, we believe, to draw attention to this serious defect in a material used so extensively in modern buildings. Since that paper was read, a case has come under his notice which clearly testifies to the truth of his position:—

"A chapel in Liverpool-road, Islington, 70 feet in length and 52 feet in breadth, took fire in the cellar, on the 2nd October, 1848, and was completely burned down. After the fire it was ascertained that, of thirteen cast-iron pillars used to support the galleries, only two remained perfect; the greater part of the others were broken into small pieces, the metal appearing to have lost all power of cohesion, and some parts were melted,

of which specimens are now shown. It should be observed that these pillars were of ample strength to support the galleries when filled by the congregation, but when the fire reached them, they crumbled under the weight of the timber only, lightened as it must have been by the progress of the fire."

But when we are considering the safety of Manchester warehouses, we are also considering the lives of the young men who are employed in them, and are in most cases located in the upper stories. In several of the wholesale warehouses in the City, as Mr. Braidwood informs us,—

"The cast-iron pillars are much less in proportion to the weight to be carried than those referred to, and would be completely in the draught of a fire. If a fire should unfortunately take place under such circumstances, the loss of human life might be very great, as the chance of fifty, eighty, or one hundred people escaping, in the confusion of a sudden night alarm, by one or two ladders to the roof, could scarcely be calculated on, and the time such escape might necessarily occupy, independent of all chance of accidents, would be considerable."

The application of water would only aggravate the difficulty, for, if it touched the red-hot iron, in all probability it would cause it to fracture and render it useless as a support. It is well known that furnace-bars are very speedily destroyed by a leakage of the boiler, the effect of the steam on the under side of the bars being to curve and twist them. To insure a perfectly fire-proof building, we must resort to one of two courses —either we must divide large warehouses into compartments by solid brick divisions, and thus confine any fire that should happen to break out within manageable limits, just as we save an iron ship from foundering, on account of a circumscribed fracture, by having her built in compartments; or we must resort to the old Roman plan of building—that is, support the floors upon brick piers and groined arches well laid in cement, for mortar will pulverize under a great heat. The former plan has the great advantage that it insures the safety of the principal contents, as well as of the building itself. The new Record Office in Fetter Lane, is a perfect specimen of the kind, and is, perhaps, the only absolutely fire-proof structure in England, being constructed of iron and stone, and having no room larger than 17 feet by 25, and 17 feet high, with a

cubical contents of only 8,000 feet. None of the rooms open into each other, but into a vaulted passage by means of iron doors; and if the documents were to take fire in any one of them, they would burn out as innocuously to the rest of the building as coals in a grate.

It must not be supposed that we disparage altogether the use of iron and stone in the erection of warehouses, even where they are built on the ordinary plan; for the outside structure they are invaluable, and render it safe from most extraneous danger. No better proof of this could be given than the experience of Liverpool, whose fires during the last half-century have been on the most gigantic scale. The larger bonded and other warehouses were generally built with continuous roofs, and with wooden doors and penthouses to the different stories, which always kindled when there was a fire on the opposite side of the narrow streets in which they were ordinarily placed. To such a lamentable extent had conflagrations increased about the year 1841, that the rate of insurance, which had been eight shillings per cent., ran up to thirty-six shillings. This was about the time of the Formby Street fire, when 379,000*l.* worth of property was destroyed, and the total losses from the beginning of the century had not been less than three millions and a quarter sterling. The magnitude of the evil called for a corresponding remedy. A Bill was obtained in 1843 for the amendment of the Building Act; party-walls were run up five feet high between each warehouse, doors and penthouses were constructed of iron, the cubical contents of the buildings themselves were limited, &c.; and the effect of these improvements was so to diminish the risk that insurances fell to their normal rate. It cannot be said, however, that Liverpool has yet purged herself of the calamity of fire.

In ordinary dwellings and in public offices the use of iron and stone, again, cannot be too much commended: in such buildings the rooms are comparatively small, and their contents are not sufficiently inflammable either in quantity or quality to injure these materials. A marked diminution in the number of fires in the metropolis may be expected, from the almost

universal use of iron and stone in new structures of this kind. The houses in Victoria Street, Westminster, built upon the "flat" system, are, we should say, entirely fireproof, as the floors are either vaulted or filled in with concrete, which will not allow the passage of fire. Nearly all Paris is built in this manner, and hence its freedom from large conflagrations.* Were it not for this, no city would be more likely to suffer, as the houses are very high, and the supply of water extremely bad. To Londoners it seems little better than a farce to watch the *sapeurs-pompiers* hurrying to a fire with an engine not much bigger than a garden squirt, followed by a water-barrel—resources which are found sufficient to cope with the enemy, confined as it is within such narrow limits.

Without going to the expense of stone and iron, we might, by taking a hint from the Parisians, make the rooms of our private houses fireproof, by abandoning the absurd custom of separating rooms by hollow wooden floors and hollow wooden partitions thinly coated with plaster—a method which has the effect of circulating the fire from the bottom to the top of the house in the quickest possible space of time. If a fire breaks out in a room, the ceiling will, it is true, stop the flames for a considerable time; but the hollow partitions full of air act as conductors, and the firemen have often found that the flames have spread from a lower to an upper apartment by this secret channel, without injuring the intermediate rooms, and without even its progress being suspected. As we understand that the Building Act is to be amended, we trust its emendators will extend the clause relating to party-walls to *rooms* as well as to houses. The expense need be but trifling, as will be seen by consulting the little work of Mr. Hosking, who was the first, we believe, to instruct the English public in the admirable methods of the Parisian builders. Instead of using flimsy laths for their partitions, they employ stout oaken pieces of wood, as thick as garden palings; these they nail firmly on

* In Nottingham, where they have gypsum in the neighbourhood, as they have in Paris, they form their floors and partitions in the same solid manner, and the consequence is, that a building is rarely burned down in that town.

each side of the framing of the partition, fill the space between with rubble and plaster of Paris, and thickly coat the whole of the wall with the latter. The floors are managed in the same manner, as well as the under side of the stairs, which are thus rendered almost as fire-proof as a stone flight. Very many lives would be saved in Great Britain if this simple expedient were adopted by our builders, instead of making the stairs of ill-fitted wood, full of air-crevices, and covering their under side with a thin film of plaster; for fire always makes for the stairs, which form the funnel of the house; and hence the necessity for rendering them as secure as possible, in order to provide a line of retreat for the inmates.

We have said that London is growing upwards to the sky—no house in any valuable portion of the metropolis being now rebuilt without the addition of at least one story. Eighty and ninety feet is getting a common height for our great offices and warehouses, which is tantamount to saying that a certain portion of the metropolis, and that a constantly increasing one, is outgrowing the power of the Fire Brigade, as no engine built upon the present plan can throw water for many minutes to such an elevation. Mr. Braidwood foresees that he must call in the aid of the common drudge, steam. In America they have already introduced this new agent with some success, and in London we have proved its power in the floating engine. Steam fire-engines, it is evident, will soon be brought into use, unless we do away with the necessity for engines at all by fixing the hose directly on the mains, as is done at Hamburg. But to effect this it will be necessary to relay the whole metropolis with much larger pipes, to increase their number, and at the same time adopt the constant-service system. At present, even if we had the water always on, the mains are often so small as to preclude the use of more than two or three hose—for, if the collective diameters of the areas of the latter exceed that of the pipe which feeds them, the pressure will cease, and no water will be propelled to any height through the jet. It cannot be denied, however, that if the streets of London were all supplied with capacious mains, and the different companies plugged them

profusely (a thing they are very chary of doing, for fear of their being injured by the wear and tear of the fire-engines), London would be rendered far more secure than it is at present, as scarcely any fire could withstand the full force of constant streams of thousands of gallons of water per minute. At present the greater portion of the water is wasted; at the destruction of the Houses of Parliament, a body of this element equal to an acre in area, and twelve feet deep, flowed from the mains, a tenth part of which could not have been used by the twenty-three jets that were playing simultaneously.

It will not here be out of place to say a few words upon the method of extinguishing flame by means of the gaseous mixture contained in Phillips's fire-annihilators. According to a writer in the "Household Words," the ordinary-sized annihilator is less than that of a small upright iron coalscuttle, and its weight not greater than can be easily carried by man or woman to any part of the house. It is charged with a compound of charcoal, nitre, and gypsum, moulded into the form of a large brick: the igniter is a glass tube inserted into the top of this brick: inclosing two phials—one filled with the mixture of chlorate of potassa and sugar, the other containing a few drops of sulphuric acid. A slight blow upon a knob drives down a pin which breaks the phials, and the different mixtures coming in contact ignite the mass, the gas arising from which, acting upon a water-chamber contained in the machine, produces a steam, and the whole escapes forth in a dense expanding cloud.

Mr. Phillips made some public experiments with his fire-annihilator three or four years ago, in which its power to put out the fiercest flame was fully proved. The timber framework of a three storied-house smeared with pitch and tar, upon being fired, was instantly extinguished: quantities of pitch, tar, and oil of turpentine, which only burn the stronger for the presence of water, were dealt with still more expeditiously. The valuable quality of rendering an atmosphere of dense smoke, in which no living thing could exist, perfectly respirable, was also shown in the most satisfactory manner. Since that time the machine has been brought into action at Leeds, where it put out a fire

in an attic; and in a very serious conflagration, which took place in the spirit-room, and afterwards extended to the main hatchway of the mail steamer the *City of Manchester*, in the autumn of 1852, it was applied with the most perfect success. There can be no doubt that in all confined places the control of the annihilator over flame is omnipotent—acting much more speedily than water, and, unlike that element, doing no damage. When the flames are unconfined, the annihilator will prove of little use, because, the gaseous cloud that issues from it not being heavier than the air, it cannot be projected to any distance. As an auxiliary to the engine, it will be invaluable in many cases, as it will enable the fireman to go into places where at present he dares not enter, unless protected by the unwieldy smoke-jacket, the supply of air to which might at any time be cut off by rubbish falling upon the hose through which it is pumped to him by the engine.

Although it is foreign to our design to speak at length of agricultural fires, and incendiarism among farming stock, the subject is too important to be entirely omitted. One of the largest London insurance-offices, interested in farming stock, posts up bills about premises they have insured, which, after stating that no lucifers are to be used, or pipes are to be smoked, goes on to say, "*This farm is insured; the fire office will be the only sufferer in the event of a fire.*" The inference is, that the labourer will feel more inclined to pay respect to the property of an insurance company than to that of the farmer. Yet it is far from being the case that the crime is always prompted by personal ill-will. One of the largest agricultural incendiaries upon record was a city weaver, who acted from a general spirit of discontent, without any hatred or knowledge of the owners. In other instances the sole motive is the "jollification" which generally follows a fire upon a farm: this fact came to light at a trial in Cambridge, eight or nine years since, when a man who was sentenced to death for setting fire to a homestead confessed to having caused twelve different fires, his only object being the desire to obtain the few shillings, and the refreshment of bread, cheese, and ale, which are given to

labourers on these occasions. On the other hand, if the farmer determines to give no recompense, the hangers-on have been known to put their hands in their pockets and watch his property burn with the utmost indifference, if not with glee.

The cause of fire which the farmer has mainly to guard against may be at one seen by the following table, for which we are indebted to the manager of the County Fire Office :—

Losses on Farming Stock between January the 1st and November the 30th, 1853.

Number of Fires.	Cause.	Amount.
		£. s. d.
49	Incendiary	5214 6 11
17	Lightning	181 5 10
22	Children and others playing with lucifers	1211 18 10
2	Steam thrashing-machines	430 0 0
38	General	1781 19 9
128		8819 11 4

These losses are upon a total insurance of eight millions. Incendiarism and children playing with lucifers are the two grand elements of destruction; and the former, we are given to understand, is below the general average. Kind treatment and better education are the only shields that can protect the farmer against incendiarism. The nuisance arising from children playing with lucifers may be abated by the absolute denial of matches to young boys about a farm, who, to cook their dinners, generally cause conflagrations near the ricks in the winter, and among the standing corn whilst "keeping birds" in the summer. The following excellent suggestions are by Mr. Beaumont, the secretary of the County Fire Office.

Precautions to be taken against a Fire.

Forbid your men to use lucifer matches, smoke, or light pipes or cigars, destroy wasps' nests, or fire off guns, in or near the rickyard, or to throw hot cinders into or against any wooden out-building on the farm, on pain of instant dismissal.

Place your ricks in a single line, and as far distant from each other as you conveniently can.

Place hay-ricks and corn-stacks *alternately;* the hay-rick will check the progress of the fire.

Keep the rickyard, and especially the spaces between the stacks and ricks, clear of all loose straw; and in all respects in a neat and clean state. The loose straw is more frequently the means of firing than the stack itself.

Have a pond close to the rickyard, although there may be but a bad supply of water.

When a steam thrashing-machine is to be used, place it *on the lee side* of the stack or barn, so that the wind may blow the sparks *away from* the stacks. Let the engine be placed as far from the machine as the length of the strap will allow. Have the loose straw continually cleared away from the engine; see that two or three pails of water are constantly close to the ash-pan, and that the pan itself is kept constantly full of water.

How to act when a Fire has broken out in a Rickyard.

Do not wait for the engines, nor for the assistance of the labourers from a distance. Depend entirely upon the immediate and energetic exertions of yourself and your own men.

Do not allow the rick or stack on fire to be disturbed—let it burn itself out—but let every exertion be made to press it compactly together, and, as far as is practicable, prevent any lighted particles flying about.

Get together all your blankets, carpets, sacks, rugs, and other similar articles, soak them thoroughly in water, and place them over and against the adjoining ricks and stacks, towards which the wind blows.

Having thus covered the sides of the ricks adjoining that on fire, devote all your attention to the latter. Press it together by every available means. If water is at hand, throw upon it as much as possible.

If engines arrive, let the water be thrown upon the blankets, &c., covering the adjoining stacks, and then upon the stack on fire.

Among the numerous hands who flock to assist upon these occasions, many do mischief by their want of knowledge, and especially by opening the fired stack and scattering the embers. In order to obviate this evil, place your best man in command over the stack on fire, desire him to make it *his sole duty* to prevent it being disturbed, and to keep it pressed and watered.

Place other men, in whose steadiness you have confidence, to watch the adjoining ricks, to keep the coverings over them, and to extinguish any embers flying from the stack on fire. In order to effect this, it is most desirable that there should be ladders at hand to enable one or two of the labourers to mount upon each stack.

If the ricks are separated from each other, and there is no danger of the fire extending to a second, it is of course desirable to save as much of the one on fire as may be possible. That, however, is not unfrequently accomplished by keeping the rick compactly together rather than by opening it.

Send for all the neighbours' blankets and tarpaulins: these are invaluable, they are near at hand, and can be immediately applied.

The companies are always very willing to pay for any damage done in attempting to save their property.

The business of the Fire Brigade is to protect property and not life from fire, though the men of course use every exertion to save the inmates, and are always provided with a "jumping-

sheet" to catch those who precipitate themselves from the roofs and windows of houses. As the danger to life generally arises at a very early stage of a fire, when the freshly aroused inhabitants fly distracted into very dangerous places, and often destroy themselves by needless haste, it is highly necessary to have help at hand before the engines can possibly arrive. There are, it is true, ladders placed against all the parish churches, but they are always locked up, often rotten, and never in charge of trained individuals: accordingly, they may be classed for inefficiency with the parish engines. A proof of this was given at the calamitous fire which occurred in Dover Street, at Raggett's Hotel, on which occasion Mrs. Round and several other persons were lost through the conduct of the keeper of one of the fire-escapes of the parish of St. James being absent when called, and drunk when, upon his arrival, he attempted to put his machine in action: the keeper of a second escape belonging to this parish, and stationed in Golden Square, refused to go to a fire in Soho, which occurred in 1852, because it was out of his district: the consequence was, than seven persons threw themselves from the windows and were all more or less dangerously injured.

In 1833 the Royal Society for the Protection of Life from Fire, which had been imperfectly organized a year or two before, was fully established, and has continued to increase the sphere of its influence year by year. The committee of management, appreciating the value of celerity in attending fires, have marked the metropolis out into fifty-five squares of half a mile each: in forty-two of these they have established a station,* in

* The following are the stations of the fire-escapes:—

Western District.—1. Edgeware Road, near Cambridge Terrace; 2. Baker Street, corner of King Street; 3. Great Portland Street, by the chapel; 4. New Road, corner of Albany Street; 5. New Road, Euston Square, in front of St. Pancras Church; 6. Camden Town, in front of "The Southampton Arms;" 7. Battle-bridge, King's Cross; 8. Guildford Street, Foundling Hospital; 9. Bedford Row, south end; 10. Hart Street, Bloomsbury, by St. George's Church; 11. Tottenham Court Road, by the chapel; 12. Oxford Street, corner of Dean Street, Soho; 13. Oxford Street, corner of Marylebone Lane; 14. Oxford Street west, corner of Connaught Place; 15. South Audley Street, by the chapel; 16. Brompton, near Knightsbridge Green; 17. Eaton Square, by St. Peter's Church;

its most central part, at which a fire-escape and trained conductor are to be found from 9 p.m. to 6 a.m. from Lady-day to Michaelmas, and from 8 p.m. to 7 a.m. from Michaelmas to Lady-day. When the remaining thirteen squares are furnished, there will be means of rescue from fire within a quarter of a mile of every house in London: thus the nightly watch for this purpose is better organized with respect to number of stations than even the fire brigade, and, like this force, it is under the general management of a single director. We are all familiar with the sight of these strange-looking machines as they come towering along in the dusk of the evening towards their appointed stations; but few perhaps have seen them in action or have examined the manner in which they are constructed. There are several methods of building them, but the one chiefly used is Wivell's, a very simple machine and speedily put in action, a description of which we take from the society's report:—

"The main ladder reaches from thirty to thirty-five feet, and can instantly be applied to most second-floor windows, by means of the carriage lever. The upper ladder folds over the main ladder, and is raised easily in the position represented, by a rope attached to its lever-irons on either side of the main ladder; or, as recently adopted in one or two of the escapes, by an arrangement of pulleys in lieu of the lever-irons. The short ladder, for first floors, fits in under the carriage, and is often of the greatest service. Under the whole length of the main ladder is a canvas trough or bagging, made of stout sailcloth, protected by an outer trough of copper-wire net, leaving sufficient room between for the yielding of the canvas in

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18. Westminster, No. 1, Broad Sanctuary; 19. Westminster, No. 2, Horseferry Road; 20. West Strand, Trafalgar Square, by St. Martin's Church; 21. Strand, by St. Clement's Church.

Eastern District.—22. New Bridge Street, by the Obelisk; 23. Holborn Hill, corner of Hatton Garden; 24. Aldersgate Street, opposite Carthusian Street; 25. Clerkenwell, St. John Street, opposite Corporation Row; 26. Islington, No. 1, on the Green; 27. Islington, No. 2, Compton Terrace, Highbury End; 28. Old Street, St. Luke's, corner of Bath Street; 29. Shoreditch, in front of the church; 30. Bishopsgate Street, near Widegate Street; 31. Whitechapel, High Street, in front of the church; 32. Aldgate, corner of Leadenhall Street and Fenchurch Street; 33. The Royal Exchange, by the Wellington Statue; 34. Cheapside, by the Western Obelisk; 35. Southwark, in front of St. George's Church; 36. Newington, Obelisk, facing "The Elephant and Castle;" 37. Kennington Cross; 38. Lambeth, by the Female Orphan Asylum; 39. Blackfriars Road, corner of Great Charlotte Street; 40. Finsbury Circus, corner of West Street; 41. St. Mary-at-Hill, corner of Rood Lane; 42. Conduit Street, corner of Great George Street.

a person's descent. The addition of the copper-wire is a great improvement, as, although not affording an entire protection against the canvas burning, it in most cases avails, and prevents the possibility of any one falling through. The soaking of the canvas in alum and other solutions is attended to; but this, while preventing its flaming, cannot avoid the risk of accident from the fire charring the canvas."

When we remember that the fire-escapes often have to be raised above windows from which the flames are pouring forth, it will be seen how valuable is this double protection against the destruction of the canvas. The necessity for it was shown at a fire in Crawford Street, Marylebone, where an explosion took place which fired the canvas and let the conductor fall through just as he was rescuing an inmate,—an accident by which he was dreadfully injured. When people look up at these fire-escapes, they generally shudder at the idea of having to enter the bag, suspended at a height of forty feet from the ground; but in the hour of danger the terrified inmates never exhibit the slightest reluctance. Once in, they slide down the bulging canvas in the gentlest manner, without any of the rapidity that would be imagined from the almost perpendicular position in which it hangs.

The fire-escape which is stationed near the New Road is constructed so that it can be taken off its wheels, in order to allow it to enter the long gardens which here extend before so many of the houses. The height attainable by these escapes varies from 43½ feet to 45 feet. A supplemental short ladder is now carried by most of them, which can be quickly fitted on an emergency into the upper ladder, and increases the height to 50 feet.

The intrepidity of the conductors of these machines is quite astonishing. Familiarity with danger begets a coolness which enables them to place themselves in positions which would prove destructive to unpractised persons. As in most cases they are the prominent actors in a drama witnessed by a whole street-full of excited spectators, they are perhaps tempted by the cheers to risk themselves in a manner they would little dream of doing under other circumstances. In addition to such a stimulus they are rewarded with a silver medal, and

with sums of money, for any extraordinary act of gallantry. Every instance of a daring rescue is entered in the society's books, from which we have extracted a few examples, to show what enterprising fellows they are. At a fire which broke out in November, 1844, in a house in Hatton Garden, Conductor Sunshine on his arrival found the following state of things. On the second floor a man was sitting on the sill of one of the windows (there were four windows abreast), and on the third floor a man was hanging by his hands to the window-sill at the other extremity of the house-front. After having rescued the man on the second floor, he did not dare to raise his third-floor ladder, for fear of hitting the hanging man's hands, and causing him to fall; accordingly, he stood upon the top rung of the second-floor ladder, and by so doing could just touch with his upstrained arms the poor fellow's depending feet. In this position, having himself but a precarious hold of the window-frame beneath, his only footing being the topmost rung, he called to the man to drop when he told him, and discovered from his silence that he was deaf and dumb. Upon being tapped upon the foot, however, he let go, and the conductor managed, incredible as it may appear, to slip him down between himself and the wall on to the top of the ladder, and brought him safely to the ground. In the next case, Conductor Chapman was the hero of the scene, although the indomitable Sunshine was present. Having crossed the roofs of two adjoining out-buildings, Chapman managed to place his ladder against the second back floor of the house on fire. Having rescued a lady, he was obliged to retrace his steps over the roofs, as the fire was coming through the tiling. He could only cross by making a bridge of the short ladder; and scarcely had they cleared the premises when it fell in with a tremendous crash.

On another occasion this intrepid man having made an entrance into the second-floor window of a house in Tottenham-court Road, he was obliged to retreat twice, by reason of his lamp going out in the dense smoke. On the third trial it remained in, and enabled him to search the place. "I called out loud," he says in his report, "and was answered by a kind of

stifled cry. I rushed across the landing to the back room, and encountered a man, who groaned out, "O save my wife!" I groped about, and laid hold of a female, who fell with me, clasping two children in her arms. I took them up, and brought them to the escape, guiding the man to follow me, and placed them all safely in the canvas, from whence they reached the ground without any injury; and, finally, I came down myself, quite exhausted." "We thought," said a bystander, "when he jumped into the second-floor window, that we should not see him again alive; and I cannot tell you how he was cheered when he appeared with the woman and her two children."

We shall content ourselves by quoting one more exploit from the Reports of the Society, the hero of which was Conductor Wood, who received a testimonial on vellum for the following service at a fire in Colchester-street, Whitechapel, on the 29th of April, 1854:—

"On his arrival, the fire was raging throughout the back of the house, and smoke issuing from every window; upon entering the first-floor room, part of which was on fire, he discovered five persons almost insensible from the excessive heat: he immediately descended the ladder *with a woman on his shoulders, and holding a child by its night-clothes in his mouth;* again ascended, re-entered the room, and having enabled the father to escape, had scarcely descended, *with a child under each arm,* when the whole building became enveloped in flames, rendering it impossible to attempt a rescue of the remainder of the unfortunate inmates."

The rewards of the Society are not always won by their own men. William Trafford, police constable 344, for instance, had one of the Society's medals presented to him, for "allowing two persons to drop upon him from the top windows of a house in College-street, Camden-town, and thereby enabling them to escape without material injury." Nothing is said as to the damage done to poor Trafford by this act of self-devotion.

The real working value of the fire-escapes may be judged from the fact that, during the twenty years they have been on duty, they have attended no less than 2,041 fires, and rescued 214 human beings from destruction. To make this excellent scheme complete, only thirteen stations have now to be esta-

blished, at a first cost of about eighty pounds each; the charitable could not give their money in a more worthy cause than in furnishing these districts, in which many thousands of inhabitants are still exposed to the most horrible of all deaths. To show that the usefulness of the Society has progressed with the number of their escapes, we need only adduce the evidence of the table in the next page, made up to the 25th of March of each year.

The fire-escapes, in addition to their own particular duty, are also of the greatest service to the firemen of the Brigade, as, by the use of their ladders, they are enabled to ascend to any window of a house, and to direct the jet directly upon the burning mass, instead of throwing it wild,—a matter of the greatest importance in extinguishing a fire: for unless you play upon the burning material, and thus cut off the flame at its root, you only uselessly deluge the building with water, which is, we believe, in many cases quite as destructive to stock and furniture as the fire it is intended to extinguish.

Year.	*Number of Stations.*	*Fires attended.*	*Lives saved.*
1845	8 increased to 11	116	13
1846	11 „ 15	96	7
1847	15 „ 21	139	11
1848	21 „ 25	197	17
1849	25 „ 26	223	31
1850	26 „ 28	198	10
1851	28 „ 30	226	36
1852	30 „ 34	253	25
1853	34 „ 40	265	46
1854	40 „ 40	328	28
	Two since added.		

Much may be done by the inmates to help themselves when a house is on fire, in case neither the engine nor the escape should arrive in time to assist them. Mr. Braidwood, in his little work on the method of proceeding at fires, advises his readers to rehearse to themselves his recommendations, otherwise when the danger comes, they are thrown, according to his experience, into "a state of temporary derangement, and seem to be

actuated only by a desire of muscular movement," throwing chairs and tables from the tops of houses that are scarcely on fire, and, to wind up the absurdity, he says, "on one occasion I saw crockery-ware thrown from a window on the third floor."

The means to be adopted to prevent the flames spreading, resolve themselves into taking care not to open doors or windows, which create a draught. The same rule should be observed by those outside; no door or glass should be smashed in before the means are at hand to put out the fire.

Directions for aiding persons to escape from premises on fire.

1. Be careful to acquaint yourself with the best means of exit from the house both at the top and bottom.
2. On the first alarm, reflect before you act. If in bed at the time, wrap yourself in a blanket, or bedside carpet; open no more doors or windows than are absolutely necessary, and shut every door after you.
3. There is always from eight to twelve inches of pure air close to the ground: if you cannot therefore walk upright through the smoke, drop on your hands and knees, and thus progress. A wetted silk handkerchief, a piece of flannel, or a worsted stocking drawn over the face, permits breathing, and, to a great extent, excludes the smoke.
4. If you can neither make your way upwards nor downwards, get into a front room: if there is a family, see that they are all collected here, and keep the door closed as much as possible, for remember that smoke always follows a draught, and fire always rushes after smoke.
5. On no account throw yourself, or allow others to throw themselves, from the window. If no assistance is at hand, and you are in extremity, tie the sheets together, and, having fastened one end to some heavy piece of furniture, let down the women and children one by one, by tying the end of the line of sheets round the waist and lowering them through the window that is over the door, rather than through one that is over the area. You can easily let yourself down when the helpless are saved.
6. If a woman's clothes should catch fire, let her instantly roll herself over and over on the ground; if a man be present, let him throw her down and do the like, and then wrap her in a rug, coat, or the first *woollen* thing that is at hand.
7. Bystanders, the instant they see a fire, should run for the fire-escape, or to the police station if that is nearer, where a "jumping-sheet" is always to be found.

Dancers, and those that are accustomed to wear light muslins and other inflammable articles of clothing, when they are likely to come in contact with the gas, would do well to remember, that by steeping them in a solution of alum they would not be liable to catch fire. If the rule were enforced at theatres, we might avoid any possible recurrence of such a

catastrophe as happened at Drury Lane in 1844, when poor Clara Webster was so burnt before the eyes of the audience, that she died in a few days.

During the twenty-one years that the Brigade has been in existence the firemen have been called out needlessly no less than 1,695 times, often indeed mischievously; for there are some idle people who think it amusing to send the men and engines miles away to imaginary fires. In most cases, however, these false alarms have originated in the over-anxiety of persons, who have hastened to the station for assistance, deceived by lights which they fancied to be of a suspicious character. Nature herself now and then gives a false alarm, and puts the Brigade to infinite trouble by her vagaries. Not only the men at one station, but nearly half of the entire force, were employed in November, 1835, from 11 P.M. to 6 A.M. on the succeeding morning, in running after the *aurora borealis*. Some of the dozen engines out on that occasion reached as far as Kilburn and Hampstead in search of those evanescent lights, which exactly simulated extensive fires. In the succeeding year the red rays of the rising sun took in some credulous members of the Brigade, and led them with their engines full swing along the Commercial and Mile-End Roads. Whilst on this false scent they came upon a real fire, which, although inferior to great Sol himself in grandeur, was far more remunerative, as the God of Morning knows nothing about rewards to first, second, and third engines.

The most remarkable and universal false alarm caused by the play of the northern lights was in the autumn of this same year, when the whole north-eastern horizon seemed possessed by an angry conflagration, from which huge clouds of smoke appeared to roll away. On this occasion the public, as well as the firemen, were deceived: crowds poured forth from the West-end on foot and in carriages to see what they imagined to be a grand effect of the "devouring element;" and thirteen engines turned out with the full impression that a whole suburb of the metropolis was in flames.

The alarms from chimneys on fire have called the engines

out no less than 1,982 times during the years the Brigade has been established, or on an average twice a week. Let us hope that, as we are setting about clearing the atmosphere by Act of Parliament, accidents of this kind will gradually cease. We may now watch with satisfaction many a tall shaft, as we steam down the river, that seems to stand idle in the air; the great rolling clouds of smoke that used to obscure the sky on the southern bank of the Thames are no longer seen, and the air is growing appreciably purer. It is evident that our manufacturers, where they have not become alive to the saving it would effect, have been coerced by the vigorous manner in which the Home Secretary has put the law in force against these black offenders; and we may hope that Dr. Arnott's smoke-consuming grate, or some modification of it, will ere long find its way into every house to complete the work.

THE POLICE AND THE THIEVES.

Most men who have arrived at that age when the last one or two buttons of the waistcoat are allowed to be unloosened after dinner, can remember the time when the safety of life and property in the metropolis depended on the efforts of the parochial watchman, a species of animal after the model of the old hackney coachman, encumbered with the self same drab greatcoat, with countless capes, with the self same Belcher handkerchief, or comforter, speaking in the same husky voice, and just as sottish, stupid, and uncivil. At night—for it was not thought worth while to set a watch in the day-time—the authorities provided him with a watch-box in order that he might enjoy his snooze in comfort, and furnished him with a huge lantern in order that its rays might enable the thief to get out of his way in time. As if these aids to escape were not sufficient for the midnight marauder, the watchman was provided with a staff with which he thundered on the pavement as he walked, a noise which he alternated with crying the hour and the state of the weather in a loud singing voice, and which told of his whereabouts when he himself was far out of sight.

Up to the year 1828, and indeed for ten years later, in the city these men were the sole defence by night of the first metropolis in the world. The Charlies, as they were familiarly termed, had very little fight in them at any time; but it is well known that they "winked hard," when required to do so by people who could afford to pay them for it. It is not astonishing that crimes under such a police flourished apace, or that robberies increased to an extent which alarmed all thoughtful

people. Mr. Colquhoun, a magistrate, whose work on the police, written at the beginning of the century, gave the first ideas of the reforms which have been since adopted; estimates that the annual value of the property stolen at the time at which he wrote, was at least 1,500,000*l.*; and that the evil was gaining ground may be judged from the fact that the number of receivers of stolen goods had increased, between 1780 and 1800, from 300 to 3,000!

In addition to the nightly watch there was another class of persons who, if more active, were calculated in a still greater degree to defeat justice, but in a totally opposite direction: we allude to those men who made their bread out of the blood of the criminal population. The Government of the country was mainly to blame for the sins committed by these loathsome creatures. Since the time of Jonathan Wild thief-catchers had been stimulated to make criminals by what was termed Parliamentary rewards, or sums of forty pounds given by the Home Office to persons affording such information as would lead to the conviction of felons. The object of the officers was to secure blood-money, not to suppress crime; and it was their deliberate practice to allow robberies to proceed, which they might have prevented, in order to obtain the reward. To use their own language, they were accustomed "to let the matter ripen" until the fee was secure, and the work was cut out for the hangman. These men must not be confounded with the Bow Street runners, or detective police, some of whom were able and perhaps honest men; but they chiefly occupied themselves with thief-catching in private preserves, where the pay was ample, and contributed little if anything to the suppression of general crime.

With a class of watchmen totally inoperative as a preventive police, with a class of informers stimulated by unwise enactments to lure men into villany, and with a code savage almost beyond belief—as late as 1800 there were 160 capital crimes, and to break the dam of a fish-pond, or to cut down an apple-tree in a garden, were offences punishable with death; it is not to be wondered at that "the deadly never-green," as

the gallows was called in the slang language of the day, bore fruit all the year round. Old Townsend, the Bow Street officer, who gave evidence before the committee which sat in 1816 to inquire into the police of the metropolis, said, "I remember in 1783, when Serjeant Adair was recorder, there were forty hung at two executions; the unfortunate people themselves laugh at it now, they call it a bagatelle." Among the more serious offences were the robberies committed by mounted highwaymen; and, in order to give an idea of their frequency, we again quote the racy evidence of Townsend:—"Formerly there were two, three, or four highwaymen—some on Hounslow Heath, some on Wimbledon Common, some on Finchley Common, some on the Romford Road. I have actually come to Bow Street in the morning, and while I have been leaning over the desk had three or four people come in and say, 'I was robbed by two highwaymen in such a place;' 'I was robbed by a single highwayman in such a place.'. People travel safe now by means of the horse-patrol, which was planned by Sir Richard Ford." This horse-patrol, established in 1805, was the first innovation on the old system of watching; and it succeeded so admirably, that in a few years the highwaymen were entirely banished from the metropolitan counties, and the great roads in the neighbourhood of London, which were once as unsafe as those in the vicinity of Rome, became as orderly as Fleet Street. It does indeed seem strange that while the outskirts of the metropolis were thus provided with a new force which proved itself to be perfectly capable of clearing away the ruffians, no means should have been taken until 1829 to supersede the old parish constables who had flourished from the time of the Saxons, and appear to have been in full bloom in Elizabeth's reign, since Dogberry is a finished portrait of the race. No means existed by which the watchmen of different parishes could be made to co-operate against their common enemy, the thief. In the city they were under the direction of no less than thirty different authorities. There were the street-keepers, the patrol, the ward-constables, &c., all acting under separate masters; and so complete was the division that

the constable of one ward would not interfere to prevent a robbery going on on the opposite side of the street, if it was out of his bounds.

Mr. J. Elliot, in his evidence, given in 1838, before the Committee on "The Metropolis Police Offices," mentions a glaring instance of the perfect paralysis of the executive which arose out of this absurd system. "Two years ago," he said, "a neighbour of mine had his warehouse broken open, and a hundred pounds' worth of tea was taken away; a watchman at the top of the street saw a cart going away from the warehouse; but he said it was not in his ward, and therefore he did not interfere." The public indisposition to get rid of the old watchmen most certainly did not arise from any ignorance of their inefficiency; they had long, in fact, been bywords of feebleness and imbecility. To thrash a Charlie was a pet pastime of the young bloods of that day. The determined propensity to doze of these worthy functionaries was a standing topic for witticism. "A friend of mine," said Erskine, "was suffering from a continual wakefulness, and various methods were taken to send him to sleep, but in vain. At last his physicians resorted to an experiment which succeeded perfectly. They dressed him in a watchman's coat, put a lantern in his hand, and placed him in a sentry-box, and he was asleep in ten minutes." It might be imagined that tokens like these indicated pretty clearly that a reform would have been hailed with delight. The result proved, however, that to abuse a thing and to amend it are widely different. Mr. Peel, who had been feeling his way to his grand experiment by the establishment of a Bow-street day patrol, obtained in 1828 the appointment of a committee of the House of Commons to inquire into the expediency of establishing a uniform system of police in the metropolis; and the committee having reported to the House in favour of the scheme, it was immediately adopted. This salutary change was not made without creating a deep sensation. That stalking-horse, "the liberty of the subject," which in truth meant the liberty of rogues to plunder, was immediately paraded before the public; and we have no doubt whatever that in the tavern debating-clubs of the day it was reported that with the fall of

the Charlies "the sun of England's glory had set for ever." And indeed to Englishmen, jealous of their personal liberty, the establishment of this new force might at first have created some well-founded alarm. It was no longer a question of a few constables, but of a standing army of nearly six thousand men, drilled like soldiers, taught to act in masses, and entirely independent of the control of the ratepayers. The very fact of the appointment, as one of the Commissioners, of Colonel Rowan, who had been employed in that quasi-military force the Irish constabulary, favoured the idea that the new police were to be a veritable *gendarmerie*. That such was the popular idea was clearly indicated by the numerous prints which appeared at the time of a fierce-looking "Peeler," armed with a belt full of pistols and a formidable sword.

Those accustomed only to the slow pace of the constitutional watchman, as he waddled out to his post, beholding with astonishment the sergeant's party as it marched along the kerb in close file, and keeping quick military step, believed that so powerful a force, concentrated under a single head, might be turned to political purposes. The constables never appeared in the streets without being followed by crowds hooting at them, and calling them by the obnoxious names of "Peelers," "Raw Lobsters," "Crushers," "Bobbies," &c. At last, in 1833, an actual collision took place between them and the great unwashed in Coldbath Fields. A meeting of Chartists was appointed to be held there, from which serious consequences were expected to arise. Directions were given to disperse it; but whilst in the performance of their duty three of the police were stabbed, and one of them mortally. It might have been thought that the very fact of a mob coming thus armed, with the express purpose of resisting a constituted authority, would have excited the indignation of the more respectable classes of the citizens. The contrary was the effect. A coroner's jury brought in a verdict of justifiable homicide—a pretty significant sign of the feeling towards the new force of the class from which the jury was selected. Such was the ferment that a commission was held to inquire into the conduct of the police, and they were exonerated

from the charge of having, as a body, acted with greater violence than was necessary. From that period, with the exception of the investigation during the Beer Bill commotion into the charge of having dispersed a gathering in Hyde Park with undue severity —a charge which was not at all substantiated—their conduct has been so exemplary as completely to have removed the original dislike. Experience has served to teach the men the virtue of moderation and patience; and they are now looked upon as a constitutional force, simply because we have got accustomed to them.

At the present time the Metropolitan Police Force consists of—a Chief Commissioner, Sir Richard Mayne; 2 Assistant-Commissioners, Captain Labalmondiere and Captain Harris; 18 Superintendents, 133 Inspectors, 625 Sergeants, and 4,954 Constables; making a total of all ranks of 5,734. The machinery by which this comparatively small force is enabled to watch by night and day every alley, street, and square of this vast metropolis, nay, tries every accessible door and window of its 400,000 houses, patrols 90 square miles of country, exercises a surveillance over the 8,000 reputed thieves who prey upon its inhabitants, and keeps in awe the 40,000 or 50,000 people who form "the uneasy classes" of the metropolis, is not very complicated. The metropolitan police district extends from Charing Cross 15 miles in every direction, and includes the whole of Middlesex and large portions of Surrey, Hertfordshire, Essex, Kent, Buckinghamshire, and Berkshire, for which seven counties the Commissioners are magistrates and the police are sworn constables. The river Thames is also under its jurisdiction from Chelsea to Barking Creek, including all its wharves, docks, landing-places, and dockyards. The entire district has a circumference of 90 miles, and extends over an area of 700 square miles, 100 of which, forming what is called the interior area, is covered with our great Babel of brick and mortar. This wide extent of ground is mapped out into 18 divisions, each of which is watched by a detachment of men, varying in number according to the extent of the area, the exposed nature of the property, or the density of the population. :—

Letters of Divisions.	*Local Names of Divisions.*	*Strength of each Division.*
A	Whitehall	380
B	Westminster	324
C	St. James's	265
D	St. Mary-le-bone	371
E	Holborn	175
F	Covent Garden	165
G	Finsbury	317
H	Whitechapel	233
K	Stepney	482
L	Lambeth	208
M	Southwark	350
N	Islington	513
P	Camberwell	408
R	Greenwich	454
S	Hampstead	410
T	Kensington	288
V	Wandsworth	381
Thames Police		103

Thus it will be seen that policeman X, who figures so often in the pages of "Punch," is a myth of our facetious contemporary.

Each division is separated into subdivisions, the subdivisions into sections, and, last of all the sections into beats. Of the main divisions, A, although one of the smallest in area, is by far the most important; it is the seat of the central authority located at Scotland Yard. Its police are much finer men (taller on the average than the Guards), and their duties are more responsible than those of any other division. They attend upon the Sovereign, the Parliament, the theatres, the parks, and all other places of public resort, such as Epsom and Ascot races, the flower shows, Crystal Palace, &c. The A division is, in fact, to the general body of Metropolitan Police what the Guards are to the army. To enable it to perform these extra duties, it has a reserve force of 250 men, drafted off on ordinary occasions in companies of fifty each to the B, C, D, G, and M divisions; upon this reserve force it draws when necessary.

The other divisions are pretty much alike in the nature of their duties, which are simply those of watching. Certain modifications, however, arise from the character of their districts; thus a constable on duty at Whitechapel, if suddenly removed to Westminster or Mary-le-bone, would find himself

considerably at fault, inasmuch as a familiarity with fights in courts, disputes with tramps, and the coarse language of low lodging-houses, is not a good school for the amenities required among a more fashionable population. In all the divisions exactly the same organization is maintained, and the same amount of arduous work is performed. Two-thirds of the entire force is on duty from nine or ten in the evening till five or six in the morning. Not long since the night-police were condemned to patrol the streets for nine hours, without sitting down, or even leaning their weary limbs against any support. This severe labour was found incompatible with the maintenance of due vigilance towards the end of the watch; the men are, therefore, now kept on duty only eight hours. Day work is divided into reliefs, and extends from six a.m. to nine p.m. Notwithstanding its greater severity, there are men who prefer the stolid unimpeded walk in the night, in which they go through their work like machines, to the more bustling and exciting day-patrol. The sergeants or inspectors make the round of the districts to see that the constables are duly parading their beats.

If a door or window is discovered in an unsafe condition, its insecurity is immediately made known to the inmates; and if the constable fails to detect the circumstance during his tour, and it is afterwards observed by his sergeant or the succeeding constable, he is reported, and fined for his neglect. Continued inattention is visited by dismissal. Offences of every kind are severely punished, as appears from the fact that, between the years 1850 and 1856, 1,276 policemen were turned out of the force. Of these, sixty-eight were criminally convicted. Thus the men are kept up to their work, and collusions with thieves are rendered exceedingly difficult. Every morning a sheet of "Occurrences" is forwarded to the Chief Commissioner at Scotland Yard, which contains the full particulars of all matters worthy of notice which have taken place during the night throughout the metropolis, and a record of all property lost or stolen, from a gold pin to a chest of plate, is kept at the same central establishment.

In case any affair of unusual importance occurs, a murder or a great robbery, the intelligence is conveyed by the constable who first becomes cognizant of it, to the central station of his division; from this point the news is radiated by policemen carrying what are termed route-papers, or papers of particulars of the offence, on the backs of which are marked the hour at which they were received at the different divisions through which they passed. In this manner information can be circulated in two hours to all the stations, excepting those belonging to the exterior or suburban districts. In these reports are given the names of the constables who were on the beats in which the offence took place, the sergeants in charge of the sections, and the names of the constables whose particular business it was to trace the offenders as far as possible. We understand, however, that the electric telegraph is now shooting its nerve-like threads to all the divisional stations in the metropolis, and, when the new agent is brought to bear, the communication will be almost instantaneous. Thus, in case of robbery, every constable will be made acquainted with the particulars without a moment's delay, and the police-net will be thrown at one cast over the entire metropolis. Thieves will no longer be able to get away with their plunder, ere a hue and cry has been raised after the property. Had the telegraph been in existence, in all probability Her Majesty's plate-chest would have been intercepted before it reached the field where it was ransacked in Shoreditch. In cases of riot of a formidable nature, the telegraph will be able to concentrate 5,000 men in a couple of hours upon any spot within five miles of Charing Cross.

Towards the outskirts of the metropolis, in the exterior or suburban districts, the widely-scattered constables chiefly perform the duties of a rural police. The great distances they have to traverse necessitates the use of horses; here, accordingly, we find the mounted police, the successors of the old horse-patrol established in 1805. The strength of this force, men and officers included, is only 120; they are furnished with powerful nags, and are armed with swords and

pistols. Indeed the foot-police, whose beats lie in unfrequented rural districts, are allowed side-arms—a precaution which the fate of the policeman, who was brutally murdered in a field at Dagenham, in Essex, some years since, proved to be by no means unnecessary.

In the middle of the metropolitan police district is the City police, under the management of the corporation. The area of this peculiar, to borrow an ecclesiastical term, is only one square mile and a quarter; but forming as it does the very centre of business, it is by far the richest part of London, for, while it contains only one-twentieth portion of its inhabitants, it possesses a fourteenth part of its wealth. This small space is, in fact, the great heart not only of the metropolis, but of the commercial world. Through its principal thoroughfares a vaster flood of traffic is poured for several hours than is to be found in any other streets in the world. In the year 1850 it was ascertained that no less than 67,510 foot-passengers, and 13,796 vehicles, containing no fewer than 52,092 persons, passed Bow Church, Cheapside, in one day. By another channel of communication, Aldgate, near the Minories, 58,430 foot-passengers, and 9,332 vehicles, containing 20,804 persons, passed in the same time; and it is estimated that altogether no less than 400,000 persons are poured into this one square mile and a quarter in the course of the twelve hours. The congregation in so confined a space of so vast a number of people, many of whom are forced to carry about with them considerable sums of money, must prove a great source of attraction to thieves of all kinds, and demands the constant vigilance of a comparatively large body of police. It was not until ten years after the successful experiment of the metropolitan police, however, that the corporation of London, wedded to its old system of ward-beadles, street-keepers, and imbecile constables, could be brought to adopt the new system; but it must be admitted that the present force, consisting of 1 superintendent, 13 inspectors, 12 station-sergeants, 47 sergeants, and 492 policemen, making a total of 565, do the duty well; and the City, with all its stored wealth, is now as safe as the rest of the metropolis. At

all the banks plain-clothes men are constantly in attendance to keep out the swell-mob, who buzz about such places as wasps do about a peach wall; and in the great thoroughfares, such as Cheapside, six or seven policemen are always to be found.

The peculiarities of the City, which produce its characteristic robberies, are the number of its uninhabited warehouses, the perfect labyrinth of lanes which traverse and intersect its streets in all directions, and the vast number of carts and vans always standing full of valuable goods at the warehouse doors. The greatest precautions are taken to mark the fastenings on the warehouse doors, so as to betray any attempt to force them; and these devices are generally successful. The reticulation of lanes will always prove a trouble to the police and a security to pickpockets. Not many years ago a bank clerk was attacked at mid-day in one of these passages in the very heart of the City, but luckily he retained hold of his case, which held most valuable property, and it is now the custom to chain these bill-cases to the person, just as they used to chain books in the olden time to the library shelves. It is also customary for bank clerks to tear the corners off all Bank of England notes, so as to render them unnegotiable, unless to persons who can produce the corresponding piece,—a contrivance which, no doubt, put a stop to audacious attacks upon these money-carriers in the middle of the day. The most common robberies are those from vehicles loading and discharging valuable silk and other goods at the warehouse doors. For the protection of such goods a small dog is the best policeman; and carts are rarely seen in the City without one of these nimble guardians. The old restriction which prevented the metropolitan police from entering the City, and the City force from entering the metropolitan districts, is now abandoned. Nevertheless, the fact of their being under a distinct jurisdiction prevents that unity of action which ought to prevail. Not long since, a City policeman patrolling one of the streets which extended into the metropolitan department, was informed by a passer-by that they were killing a constable at the top of the street, to which the policeman replied that it was out of his beat and he could not interfere! When next

the Sibyl presents her leaves to the city corporation, in all probability the present isolated system of police will not be found inscribed on any one of them.

Scotland Yard, as we have said, is the brain or central ganglion which directs the system of metropolitan police. Here the commissioners sit daily, and are ready to receive the complaints or other communications of the public. Its rooms are full of clerks, but all in the uniform of the police; in one office may be seen the constables wielding the pen instead of the truncheon, preparing daily returns and reports; in another, reading the morning and country papers, to learn what is doing that may require their presence, and to know what thieves have turned up in the police courts; in a third room an inspector is reading to the clerks from the different divisions any particulars it may be advisable to communicate to the entire force; in a fourth we see the secret chamber of the detective police—those human moles who work without casting up the earth lest their course should be discovered. In an office apart from the rest are the foreign detectives, who watch over *mauvais sujets* from abroad. The entire floating foreign population in the metropolis is well known to the police, and no plots against allied governments could well be hatched in London without their cognizance. All articles lost in public conveyances are here taken charge of. The "Lost Property Office" contains piles of umbrellas, parasols, and walking-sticks, together with a curious assemblage of articles of jewellery and wearing apparel, brought by honest cabmen. On one occasion a parcel with cash to the amount of 1,600*l.* was deposited; and on another a thousand-pound note. Valuable property is always claimed immediately; but sticks, parasols, and umbrellas accumulate in a manner which proves that their loss is due to the carelessness of their owners and not to the loose morality of others. The offices for the inspectors of dangerous structures and for licensing common lodging-houses and the drivers and conductors of public conveyances, all of which departments are managed by the police, are close at hand.

In the drilling-ground of the force—an open space surrounded

by a hoarding close to the State Paper Office—there are generally from thirty to forty men in course of training, to fill up the gaps caused by dismissals, resignations, &c. On the occasion of our visit the yard was occupied by two bodies—the raw material, in the shape of some twenty individuals dressed in every variety of costume; and another batch of the finished article, buttoned up in blue and resplendent with plated buttons. The eye had only to run along the "gammut of men," if we may so term the fresh recruits drawn up before us, in order to see from how many ranks of society the police brigade is reinforced; smock-frocks, shooting-coats, frock-coats, tail-coats, some seedy and worn, some still good and fresh, denoted the condition in life of their owners, and the necessities to which some of them were reduced. Young men flushed with hope come from the provinces to push their fortunes, after a brief struggle find themselves stranded, and accept this, the most readily-obtained respectable service.

As every policeman must be able to read and write, have a good character, and be of sound body and mind, the mere overflowings of the labour-market are excluded from the force; moreover, persons can always leave the service by giving a month's notice. For these reasons a much more intelligent class of men recruit the police than the army, and it is singular to note how this intelligence tells. The drill of constables and soldiers is nearly alike, yet the former learn all their movements in a fortnight, whilst the latter require at least two months. Intelligence of a certain kind, however, may be carried to far; your sharp Londoner makes a very bad policeman; he is too volatile and conceited to submit himself to discipline, and is oftener rejected than the persons from other parts, with whom eight-tenths of the force are recruited. The best constables come from the provincial cities and towns. They are both quicker and more "plucky" than the mere countryman fresh from the village—a singular fact, which proves that manly vigour, both physical and mental, is to be found in populations neither too aggregated nor entirely isolated.

The policemen, perfect in their material drill, next undergo a mental one. Drawn up in line, a sergeant or inspector questions them as to their duties. "Supposing you see two men fighting, what would you do?" or, "If you were to discover a house on fire, how would you act?" Sometimes the constable addressed answers the question, but more generally his interrogator does it for him. When drilled and catechized to the full pitch, he doffs his plain clothes for a uniform, and comes out in the full bloom of a policeman. But he is still a neophyte, and before he is intrusted with a beat he attends at a police-court in order to watch the manner in which trained constables comport themselves in the witness-box. Having learned to give evidence clearly and briefly, to listen to ludicrous scenes without smiling, and to bear bad language with imperturbable patience, he is marched off to the division in which he has elected to serve (the policeman is always if possible allowed this privilege), and with his armlet on his wrist, his staff in one pocket, and his rattle in the other, he patrols his beat.

Two especial injunctions are given to him—never to show his staff except to protect himself, and never to spring his rattle at night except in a case of great urgency. The care taken to hide his offensive weapon is one of the best points of our police arrangements. The officers sent over here to gain information, prior to the introduction of the English police system in Paris, were astonished at this forbearance: the Frenchmen could not understand why a man should carry a deadly weapon, unless to make a demonstration with it! In this little incident we see the essential difference between the French and English character. In six months' time it is expected that the young hand will prove a steady officer; that a wild young fellow, who perhaps only a few months before knew no restraint, should become a machine, moving, thinking, and speaking only as his instruction-book directs; and so wonderful are the powers of organization that such an officer he generally becomes. We all know him, for we see him day by day as we promenade the streets. Stiff, calm, and inexorable, he seems to take no interest in any mortal thing; to have neither hopes

nor fears. Amid the bustle of Piccadilly or the roar of Oxford Street, P. C. X 59 stalks along, an *institution* rather than a man. We seem to have no more hold of his personality than we could possibly get of his coat, buttoned up to the throttling-point. Go, however, to the section-house, an establishment generally attached to the chief station of each division, in which the unmarried policemen are lodged, and enter the common hall or reading-room, and you no longer see policemen, but men; they have cast off their tight coats, as certain other unboiled lobsters, at fixed intervals, cast off their shells. They are absolutely laughing with each other! Some are writing, some are reading the morning papers, a group are grinning at the caricature of P. C. X 202 in "Punch;" some are deep in the horrors of a romance, extended at full length along a bench, with their trowsers tucked up; all are at their ease, taking rational amusement. In the common room of every section-house there is a library.* That in King Street, Westminster, contains 1,200 volumes, a well-selected medley of subjects, grave and gay. Some of the volumes, indeed, surprised us, as they seemed to indicate an erudite taste which we did not give police constables credit for possessing. We give a few of their titles as they came under our notice:—

Taylor's Holy Living.
The Annals of the English Bible.
Macaulay's Essays.
Alison's Europe.
Paley's Works.
Byron's Works.
The Waverley. Novels.
James's Naval History.
Lane's Modern Egyptians.
Life of Mohammud, by Mohun Lal.
Tom Cringle's Log.
Bishop Heber's Journal.
Washington Irving's Works.
Colonial and Home Library.

What do you think of the list, good reader? Policemen reading Paley! Can we wonder that they are so very blue? But we must not misrepresent the force. If volumes such as these are thumbed sufficiently to show that some Scotch sergeant has a taste for theological reading and "fee-lo-so-phy," the

* Mr. Walker, the superintendent of the A Division, we believe, selected the works in these libraries. The love of books evinced by this gentleman sufficiently proves that literary tastes are not incompatible with the energetic performance of police duties.

prevalent inquiry is after good English literature; and, although the "Wandering Jew" and the "Mysteries of Paris." are in the library, we are told that the men do not like, and apparently do not understand, French romances. The library is only open on Thursdays, and then but for two hours. For this there is a philosophical reason. "What we can always see," said the superintendent who kindly showed us over the Section, "we never see; it is only strangers that know all the sights of the metropolis." On the same principle, the issue of books is limited in the manner we have stated, and we are told that the plan answers admirably. The dormitories at King-street accommodate about ninety persons, the great portion of whom, having done night-duty, we saw fast asleep, on a fine tempting afternoon. It takes full three months for the men to acquire the habit of sleeping in the day; but, once acquired, they never lose it afterwards, although they return at stated intervals to day-duty again. They find their own breakfasts and suppers, but they mess together at dinner. They take it in turns to cater for the week; and the emulation thus created proves to the advantage of the mess, as we hear that early pease, and other delicacies of the season, find their way to the policemen's table.* It would be an immense boon to the Benedicts of the force if accommodation could also be found for them in the section-houses. In these days of model lodging-houses such an injustice to family men should scarcely be allowed to exist.

One of the strongest reasons which weighed with Mr. Peel in proposing the establishment of the new police in 1829 was the expediency of instituting a force powerful enough to cope with mobs, and to repress those incipient commotions which, if too roughly dealt with by the military, are apt to leave an abiding sense of irritation in the public mind. The massacre of "Peterloo," as it was vulgarly called, without doubt proved to the reflective mind of Peel that civil disturbances could no

* The partiality for the cook ascribed to the policeman is, we are assured, a slander upon the force. The commissariat at home is too good to justify any suspicion of this ignoble sort of cupboard love.

longer be dealt with by the sharp edge of the sword, and that a knock-down blow of a truncheon was far more congenial to the English skull than the sabre of the yeoman or the bullet of the "sodger." That view was undoubtedly correct. The new police have not, it is true, come in contact with excited mobs on more than three occasions,—the affair of Coldbath Fields, in the year 1833, the Chartist gathering in 1848, and the skirmish in the Park, of July, 1855. On each of these occasions the crowd was immediately dispersed, and whatever irritation might have existed at the time, it quickly died away. There seems to be no fear that a London mob will ever prove a serious thing in the face of our present corps of policemen. A repetition of the Lord George Gordon riots would be an impossibility. Those who shudder at the idea of an outbreak in the metropolis, containing two millions and a half of people and at least fifty thousand of the "dangerous classes," forget that the capital is so wide that its different sections are totally unknown to each other. A mob in London is wholly without cohesion, and the individuals composing it have but few feelings, thoughts, or pursuits in common. They would immediately break up before the determined attack of a band of well-trained men who know and have confidence in each other. The genuine Londoner, moreover, is no fighter; he will "slang" and "chaff" wittily with his tongue, but he will not come to blows. Those who have any experience in the *gamins* of the great towns in England must have observed the vast difference between the want of pugnacity in the cockney-bred boy, and the love of fisticuffs among the youths of Bristol, Birmingham, or Manchester, which are the nurseries of prize-fighters. The great town has sharpened the brain of the Londoner, but unstrung his sinews and cowed his courage, and he is a pigmy in the hands of the vigorous provincials. The middle classes are an exception, and we doubt not that the same spirit which marched with the trained-bands from London to Gloucester, in the civil war, is still to be found among them.

We believe that the only quarter in which any formidable riot could take place would be eastward, in the neighbourhood

of the Docks, where there are at least tweve thousand sailors in the river or on shore, ready for a spree, fearless and powerful, and acting with an undoubted *esprit de corps*. These, if associated with the seven or eight thousand dock-labourers and lightermen, would certainly produce a force difficult to cope with. For such emergencies the police are provided with side-arms, but we fear they are not well trained to their use, and it would take at least fourteen days to perfect them. If in any civil disturbance, however, it should come to cold steel, we think that the soldiers would prove far more effective, and their interference would be less galling than that of the police armed with murderous weapons. Prevention is the true duty of the civil force. One of the simplest methods for breaking up a crowd, in order that it may have no unity of action, is to march sections of constables, in double files of say fifty each; these sections moving a few yards apart speedily cleave by their weight the densest mob in twain. When once this division is made, the order is given to face right and left and march; by this means the mass is riven into a dozen helpless portions. If the mounted police can be brought into action, it is customary to march them in every direction through the crowd. Those who were in Hyde Park on the evening of the great Sunday gathering in July 1855, witnessed how effectually this singular manœuvre was executed under the orders of Captain Labalmondiere. The horsemen, circulating among the immense crowd, entirely disintegrated the mass, and rendered it helpless for a common movement, and this without any altercation; for what use could there be in arguing with horses' heels? A policeman's staff thrust in your chest, accompanied by a peremptory order to stand back, would probably "rile" the best of us; but what is to be said against the push of a horse's flank or the descent of a heavy hoof? Everybody is glad to get as quickly as possible out of the way, and thus the whole company break as it were of their own accord.

Let us now revert to the Detective Police. When the Metropolitan force was established in 1829, the old Bow-street officers, not caring to work with the new system, retired from

public life, and set up a private practice in hunting out offenders, in which occupation some of them continue to this day. For fifteen years there was no establishment of detectives connected with the police; but the inconvenience of not possessing so necessary a wheel in the constabulary machinery induced Sir James Graham, who had, perhaps, a leaning towards this branch of the profession, to revive the fraternity. The force consists of three inspectors, nine sergeants, and a body of police termed "plain-clothes men," whose services can be had at any moment. There are about six policemen in each division, who take upon themselves the duty of detectives when wanted, which affords a total number of 108 auxiliaries, upon whom the inspectors and sergeants can rely to carry out their orders with silence and address. In all great gatherings, these men are distributed among the crowd, dressed according to the character of the assembly. Thus, at an agricultural meeting, smock-frocks are worn, or the dress of a small farmer; at a review, the habiliments of a decent mechanic in his Sunday best. In this respect they follow the principle of Nature, who protects her creatures from observation by giving them coats of a colour somewhat similar to that of the soil they inhabit,—to the arctic fox, a fur white as the surrounding snow; and to the hare, a coat scarcely distinguishable from the brown heath in which she makes her form. It is the general rule to station these plain-clothes men as near as possible to the policemen of their own division, in order that they may be assisted in capturing prisoners.

Man is eminently a hunting animal, but there is no prey which he follows with such zest and perseverance as his fellow-man. Some policemen, directly they enter the force, show the taste so strongly that they are at once marked off for this special service. Others, on the contrary, will remain years without detecting a single crime. From among the 6,000 persons composing the force, a splendid field is afforded for selecting good men; and Bow-street, great as was its fame, did not turn out more intelligent detectives than we now possess. The officers, although they are not hail-fellow-well-met with every

thief, as in the last century, still find it necessary to keep up a personal knowledge of the criminal population, especially with that portion of it whose members they may at one time or other be likely to "want." The detectives, as well as thieves, are generally famous for some particular line of business. One is good at housebreakers, another knows how to follow up the swell-mob, and a third is a crack hand at forgers. By confining themselves to distinct branches of the art, they acquire an especial sense, as it were, for the work; and it is remarkable how much their trouble is lightened by the division of labour. The detective stands in a very different position from the ordinary policeman; his work, long and laborious though it may be, must, to succeed, never see the light. Although he may have followed a case for years, all the public knows of it is summed up in the four words used by the constable who states the charge at the police court—"from information I received," &c. The detective lays the foundation which, from the shifting soil he has to deal with, is frequently far more extensive than the superstructure. His duty is to pursue the criminal through all his shiftings and turnings, until the case is clear against him; and then fearlessly to draw him forth from his hiding-place, as a ferret would a rabbit, and hand him over to an ordinary constable to bring to the judgment-seat.

Much of the information by which the perpetrators of crimes are discovered comes from their own body: thus two thieves fall out, and one, prompted by revenge, and stimulated by the hope of a reward, splits upon his confederate; or some abandoned woman, jealous of another, gives information which leads to her paramour's apprehension. The revenge taken by members of the fraternity upon a "pal" whose treachery has been discovered, is often so signal, that the utmost caution is exercised in communicating with the police, lest suspicion should be excited. The constable, whose aim is to encourage these revelations, must never, by his want of address, give any hint of the source from which he receives his information; nay, he finds it necessary sometimes to pursue keenly a false scent in order to divert attention from the betrayer.

Between the detective and the thief there is no ill blood: when they meet they give an odd wink of recognition to each other—the thief smiling, as much as to say, "I am quite safe, you know;" and the detective replying with a look, of which the interpretation is, "We shall be better acquainted by-and-by." They both feel, in short, that they are using their wits to get their living, and there is a sort of tacit understanding between them that each is entitled to play his game as well as he can.

In pursuing the track of an offender, the officers often come across other crimes of which they were not aware, and for a time are thrown off the scent, just as a pack of fox-hounds by a hare which crosses their path. In such cases the only way is to try back until the original trail is found. It is not uncommon in this manner to stumble upon a regular network of roguery, and to discover the whereabouts of parties who have long been "wanting." The most trivial hint will suffice to put the detective on the right track: for, like men accustomed to work in the dark, things which to other persons are invisible, to them appear clear as noon-day. The gossiping tendency of neighbours is especially useful to them in worming out secrets. To obtain a single link in a chain of facts, they will often hang about a house for months, interrogating the newspaper lad, waylaying the servant girl as she is going for her supper beer, and picking all he wants to know out of her as easily as a locksmith picks a lock, and with quite as little consciousness on the part of the person operated upon.

Mr. Dickens published some excellent papers in the early numbers of "Household Words," which illustrate admirably the habits of these officers. From these we select the following story, not that it is the most dramatic, but because it shows the vast number of dodges by which the detectives accomplish their ends:—

"'Tally-ho Thompson,' says Sergeant Witchem, after merely wetting his lips with his brandy-and-water, 'Tally-ho Thompson was a famous horse-stealer, couper, and magsman. Thompson, in conjunction with a pal that occasionally worked with him, gammoned a countryman out of a good round sum of money, under pretence of getting him a situation—the regular

old dodge—and afterwards in the "Hue and Cry" for a horse—a horse that he stole down in Hertfordshire. I had to look after Thompson, and I applied myself, of course, in the first instance, to discovering where he was. Now, Thompson's wife lived, along with a little daughter, at Chelsea. Knowing that Thompson was somewhere in the country, I watched the house—especially at post-time in the morning—thinking Thompson was pretty likely to write to her. Sure enough, one morning the postman comes up, and delivers a letter at Mrs. Thompson's door. Little girl opens the door, and takes it in. We're not always sure of postmen, though the people at the post-offices are always very obliging. A postman may help us, or he may not,—just as it happens. However, I go across the road, and I say to the postman, after he has left the letter, "Good morning! how are you?" "How are *you?*" says he. "You've just delivered a letter for Mrs. Thompson." "Yes I have." "You didn't happen to remark what the post-mark was, perhaps?" "No," says he, "I didn't." "Come," says I, "I'll be plain with you. I'm in a small way of business, and I have given Thompson credit, and I can't afford to lose what he owes me. I know he's got money, and I know he's in the country, and if you could tell me what the post-mark was, I should be very much obliged to you, and you'd do a service to a tradesman in a small way of business that can't afford a loss." "Well," he said, "I do assure you that I did not observe what the post-mark was; all I know is, that there was money in the letter—I should say a sovereign." This was enough for me, because of course I knew that Thompson, having sent his wife money, it was probable she'd write to Thompson by return of post to acknowledge the receipt. So I said "Thankee" to the postman, and I kept on the watch. In the afternoon I saw the little girl come out. Of course I followed her. She went into a stationer's shop, and I needn't say to you that I looked in at the window. She bought some writing-paper and envelopes, and a pen. I think to myself, "That'll do!"—watch her home again, and don't go away, you may be sure, knowing that Mrs. Thompson was writing her letter to 'Tally-ho,' and that the letter would be posted presently. In about an hour or so, out came the little girl again, with the letter in her hand. I went up, and said something to the child, whatever it might have been; but I couldn't see the direction of the letter, because she held it with the seal upwards. However, I observed that on the back of the letter there was what we call a kiss—a drop of wax by the side of the seal—and again, you understand, that was enough for me. I saw her post the letter, waited till she was gone, then went into the shop, and asked to see the master. When he came out, I told him, "Now, I'm an officer in the Detective Force; there's a letter with a kiss been posted here just now, for a man that I'm in search of; and what I have to ask of you is, that you will let me look at the direction of that letter." He was very civil—took a lot of letters from the box in the window—shook 'em out on the counter with the faces downwards—and there among 'em was the identical letter with the kiss. It was directed, "Mr. Thomas Pigeon, Post-Office, B——, to be left till called for." Down I went to B—— (a hundred and twenty miles or so) that night. Early next morning I went to the post-office; saw the gentleman in charge of that department; told him who I was; and that my object was to see and track the party that should come for the letter for Mr. Thomas Pigeon. He was very polite, and said, "You shall have every assistance we can give you; you can wait inside the office; and we'll take care to let you know when anybody comes for the letter." Well, I waited there three days, and began to think that nobody ever *would* come. At last the clerk whispered to me, "Here! Detective! Somebody's come for the letter!" "Keep him a

minute," said I, and I ran round to the outside of the office. There I saw a young chap with the appearance of an ostler holding a horse by the bridle, stretching the bridle across the pavement while he waited at the post-office window for the letter. I began to pat the horse, and that; and I said to the boy, "Why, this is Mr. Jones's mare!" "No, it a'nt." "No?" said I: "she's very like Mr. Jones's mare!" "She a'nt Mr. Jones's mare, anyhow," says he: "it's Mr. So-and-So's, of the Warwick Arms.' And up he jumped, and off he went—letter and all. I got a cab, followed on the box, and was so quick after him, that I came into the stableyard of the Warwick Arms by one gate just as he came in by another. I went into the bar, where there was a young woman serving, and called for a glass of brandy-and-water. He came in directly, and handed her the letter. She casually looked at it without saying anything, and stuck it up behind the glass over the chimney-piece. What was to be done next?

"'I turned it over in my mind while I drank my brandy-and-water (looking pretty sharp at the letter the while), but I couldn't see my way out of it at all. I tried to get lodgings in the house, but there had been a horse-fair, or something of that sort, and it was full. I was obliged to put up somewhere else, but I came backwards and forwards to the bar for a couple of days, and there was the letter, always behind the glass. At last I thought I'd write a letter to Mr. Pigeon myself, and see what that would do. So I wrote one, and posted it; but I purposely addressed it, Mr. John Pigeon, instead of Mr. Thomas Pigeon, to see what *that* would do. In the morning (a very wet morning it was) I watched the postman down the street, and cut into the bar, just before he reached the Warwick Arms. In he came presently with my letter. "Is there a Mr. John Pigeon staying here?" "No!—stop a bit though," says the barmaid; "and she took down the letter behind the glass. "No," says she, "it's Thomas, and *he* is not staying here. Would you do me a favour, and post this for me, as it is so wet?" The postman said "Yes:" she folded it in another envelope, directed it, and gave it him. He put it in his hat, and away he went.

"'I had no difficulty in finding out the direction of that letter. It was addressed, "Mr. Thomas Pigeon, Post-Office, R———, Northamptonshire, to be left till called for." Off I started directly for R———. I said the same at the post-office there as I had said at B———; and again I waited three days before anybody came. At last another chap on horseback came. "Any letters for Mr. Thomas Pigeon?" "Where do you come from?" "New Inn, near R———." He got the letter, and away *he* went at a canter.

"'I made my inquiries about the New Inn, near R——, and hearing it was a solitary sort of house, a little in the horse line, about a couple of miles from the station, I thought I'd go and have a look at it. I found it what it had been described, and sauntered in to look about me. The landlady was in the bar, and I was trying to get into conversation with her; asked her how business was, and spoke about the wet weather, and so on; when I saw, through an open door, three men sitting by the fire in a sort of parlour or kitchen, and one of those men, according to the description I had of him, was Tally-ho Thompson!

"'I went and sat down among 'em, and tried to make things agreeable; but they were very shy—wouldn't talk at all—looked at me and at one another in a way quite the reverse of sociable. I reckoned 'em up, and finding that they were all three bigger men than me, and considering that their looks were ugly—that it was a lonely place—railroad station two miles off—and night coming on—thought I couldn't do better than have a drop

of brandy-and-water to keep my courage up. So I called for my brandy-and-water; and as I was sitting drinking it by the fire, Thompson got up and went out.

"'Now, the difficulty of it was that I wasn't sure it *was* Thompson, because I had never set eyes on him before; and what I had wanted was to be quite certain of him. However, there was nothing for it now but to follow, and put a bold face upon it. I found him talking outside in the yard with the landlady. It turned out afterwards that he was wanted by a Northampton officer for something else, and that, knowing that officer to be pock-marked (as I am myself), he mistook me for him. As I have observed, I found him talking to the landlady outside. I put my hand upon his shoulder—this way—and said, 'Tally-ho Thompson, it's no use. I know you. I'm an officer from London, and I take you into custody for felony!' 'That be d—d!' said Tally-ho Thompson.

"'We went back into the house, and the two friends began to cut up rough, and their looks didn't please me at all, I assure you. 'Let the man go. What are you going to do with him?' 'I'll tell you what I'm going to do with him. I'm going to take him to London to-night, as sure as I'm alive. I'm not alone here, whatever you may think. You mind your own business, and keep yourselves to yourselves. It'll be better for you, for I know you both very well.' *I'd* never seen or heard of 'em in all my life, but my bouncing cowed 'em a bit, and they kept off, while Thompson was making ready to go. I thought to myself, however, that they might be coming after me on the dark road to rescue Thompson; so I said to the landladly, 'What men have you got in the house, missis?' 'We haven't got no men here,' she says, sulkily. 'You have got an ostler, I suppose?' 'Yes, we've got an ostler.' 'Let me see him.' Presently he came, and a shaggy-headed young fellow he was. 'Now, attend to me, young man,' says I; 'I'm a detective officer from London. This man's name is Thompson. I have taken him into custody for felony. I'm going to take him to the railroad station. I call upon you, in the Queen's name, to assist me; and mind you, my friend, you'll get yourself into more trouble than you know of, if you don't!' You never saw a person open his eyes so wide. 'Now, Thompson, come along!' says I. But when I took out the handcuffs, Thompson cries, 'No! None of that! I won't stand *them!* I'll go along with you quiet, but I won't bear none of that!' 'Tally-ho Thompson,' I said, 'I'm willing to behave as a man to you, if you are willing to behave as a man to me. Give me your word that you will come peaceably along, and I don't want to handcuff you.' 'I will,' says Thompson, 'but I'll have a glass of brandy first.' 'I don't care if I've another,' said I. 'We'll have two more, missis,' said the friends; 'and con-found you, constable, you'll give your man a drop, won't you?' I was agreeable to that; so we had it all round; and then my man and I took Tally-ho Thompson safe to the railroad, and I carried him to London that night. He was afterwards acquitted on account of a defect in the evidence; and I understand he always praises me up to the skies, and says I'm one of the best of men.'"

The largest of all the classes of thieves, and that which employs the most extensive range of intellect, of age, and of dress, is the pickpocket. From the first-rate thief, who "works about the banks for six or nine months until he gets a "good thing," to the miserable urchin who filches a pocket-handker-

chief, how vast a descent! Although strung together by the common thread of crime, and pursuing, as it were, the same line of business, a duke could not, and certainly would not, look down upon a street-sweeper with half the hauteur that the leading rogues do upon the Fagin-led urchin who replenishes with bandanas the stalls of Field-lane. The popular notion of swellmobsmen is far wide of the truth. It is supposed that they may be at once recognized by a certain ultra-foppish manner of dressing, and an excess of jewellery, whereas the aim of a professor of the "conveying" art is to go about his occupation unobserved; for to be known to the police is to be disappointed of his booty. He has his clothes built by the most correct tailor, and gets himself up as much like a gentleman as possible. The necessities of his art, it is true, oblige him to carry a coat over his arm in all weathers; but so may any veritable man of fashion, without creating suspicion. Still, though he may manage to pass free in a crowd, and frequent fashionable assemblies without being suspected by the public, the professed thief-catcher is rarely to be deceived by appearances. As the hunter marks his quarry by peculiar signs known only to his craft, so the detective can at once ascertain whether the fine gentleman walking carelessly along is "wrong," as the slang term is, or a respectable character.

The principal sign by which a thief may be distinguished in any assembly is the wandering of his eye. Whilst those about him are either listening to a speaker or witnessing a spectacle, his orbits are peering restlessly, not to say anxiously around. When the thief-taker sees this, he knows his man. One of the detective police who attended at the laying of the foundation-stone of the Duke of Wellington's College, thus explained to us the capture of a gentlemanly-looking person who was present on that occasion:—

"If you ask me to give my reason why I thought this person a thief the moment I saw him, I could not tell you; I did not even know myself. There was something about him, as about all swellmobsmen, that immediately attracted my attention, and led me to bend my eye upon him. He did not appear to notice my watching him, but passed on into the thick of the crowd, but then he turned and looked towards the spot in

which I was—this was enough for me, although I had never seen him before, and he had not, to my knowledge, attempted any pocket. I immediately made my way towards him, and, tapping him on the shoulder, asked him abruptly, 'What do you do here?' Without any hesitation, he said, in an under tone, 'I should not have come if I had known I should have seen any of you.' I then asked him if he was working with any companions, and he said, 'No, upon my word, I am alone;' upon this I took him off to the room which we had provided for the safe-keeping of the swellmobsmen."

This was a daring stroke, but it succeeded as it deserved. If the man had been really honest, he would have turned indignantly upon the person who questioned him; but pickpockets are essentially cowards, both morally and physically, and they generally come down at once to save trouble, when the officer has his eye upon them, as the opossums were wont to do when they espied that dead shot Colonel Crockett. There is a striking example of this weakness of their tribe in the amusing work of the "Englishwoman in America." The scene is an American railway-carriage:—

"I had found it necessary to study physiognomy since leaving England, and was horrified by the appearance of my next neighbour. His forehead was low, his deep-set and restless eyes significant of cunning, and I at once set him down as a swindler or pickpocket. My convictions of the truth of my inferences were so strong, that I removed my purse—in which, however, acting by advice, I never carried more than five dollars—from my pocket, leaving in it only my handkerchief and the checks for my baggage, knowing that I could not possibly keep awake the whole morning. In spite of my endeavours to the contrary, I soon sank into an oblivious state, from which I awoke to the consciousness that my companion was withdrawing his hand from my pocket. My first impulse was to make an exclamation; my second, which I carried into execution, to ascertain my loss; which I found to be the very alarming one of my baggage-checks; my whole property being thereby placed at this vagabond's disposal, for I knew perfectly well, that if I claimed my trunks without my checks, the acute baggage-master would have set me down as a bold swindler. The keen-eyed conductor was not in the car, and, had he been there, the necessity for habitual suspicion, incidental to his position, would so far have removed his original sentiments of generosity as to make him turn a deaf ear to my request, and there was not one of my fellow-travellers whose physiognomy would have warranted me in appealing to him. So, recollecting that my checks were marked Chicago, and seeing that the thief's ticket bore the same name, I resolved to wait the chapter of accidents, or the reappearance of my friends. . . . . With a whoop like an Indian war-whoop the cars ran into a shed—they stopped—the pickpocket got up—I got up too—the baggage-master came to the door: 'This gentleman has the checks for my baggage,' said I, pointing to the thief. Bewildered, he took them from his waistcoat-pocket, gave them to the baggage-master, and went hastily away. I had no inclination to cry 'Stop

thief!' and had barely time to congratulate myself on the fortunate impulse which had led me to say what I did, when my friends appeared from the next car. They were too highly amused with my recital to sympathize at all with my feelings of annoyance; and one of them, a gentleman filling a high situation in the East, laughed heartily, saying, in a thoroughly American tone, 'The English ladies must be 'cute customers if they can outwit Yankee pickpockets.'"

The quickness and presence of mind of this lady was worthy of the practised skill of the detective who marked his man at the Wellington College ceremonial. That same gathering afforded another example of the cowardice of the swell mob. Immediately they came upon the ground, fourteen of them were netted before they had time to try the lightness of their fingers. They were confined in a single room with only two policemen to guard them, yet they never attempted to escape, although their apprehension was illegal, but waited patiently until the crowd had dispersed. When the doors were thrown open, they immediately made a rush like so many rats from a trap, and never stopped until they were well out of sight of the police. The rapidity with which they bolted was caused by their desire to avoid being paraded before the assembled constables, a measure which is often taken by the police, in order that they may know their men on another occasion. If, however, the swellmobsman's eye is for ever wandering in search of his prey, so also is that of the detective; and instances may occur when the one may be mistaken for the other. At the opening of the Crystal Palace, a party of detectives distributed among the crowd, observed several foreigners looking about them in a manner calculated to rouse their suspicions. These individuals were immediately taken into custody, notwithstanding their strong and vehement expostulations made in very good French. When brought before the inspector, it came out that they were Belgian police, sent over at the request of our Government to keep a look out on the *mauvais sujets* of their own nation.

The swellmobsmen proper generally work together at races, in gangs of from three to seven; those who "cover," as it is termed, making a rush to create pressure, in order that the pickpocket may use his hand without being noticed. In taking

watches it is generally supposed that the ring is cut by a pair of wire-nippers. This is rarely the case; thieves have no time in operating to use any other implement than their own nimble fingers, and the ring of the watch is wrenched off with the utmost ease, as the purchase upon it is very great. A police magistrate, of large experience, suggests that the way to baffle the fraternity would be to *make the ring work upon a swivel.* Inferior classes of thieves work in smaller "schools," say of a couple of woman and a boy, whose little hand is capitally adapted for the work. Whilst one woman pushes, the lad attempts the pocket of the person nearest him, and the third "watches it off," as it is called; if she observes that the youth's attentions have been noticed, she immediately draws him back with a "Ha, Johnny, why do you push the lady so!" Look to your pockets, good reader, when you see forward little Johnnies about—especially at railway stations. Such places are the chief resort of this class of pickpockets, and we hear that theatres and churches, just as the people are coming out, are favourite haunts—the women creating a stoppage at the door, and the children taking advantage of it. Women's pockets are much more easily picked than men's, for the reason that the opening through the dress to it is larger, and it hangs by its weight free of the person. In a crowd, the operation is easy enough, as the general pressure masks the movement of the depredator's hand; when the victim is walking, a more artistic management is required. The hand is inserted at the moment that the right leg is thrown forward, because the pocket then hangs behind the limb, an essential condition for the thief, as the slightest motion is otherwise felt upon the leg. The trowser-pockets of a man are never attempted in the streets: but in a crowd, as at a race, he can be cleaned out by a school of mobsmen of everything in his possession, with little fear of detection. The first step is to select their victim; to do this demands some caution; and if they cannot see whether he carries a purse, and if they have no opportunity of watching him pull it out, they will feel all his pockets. The "spotter," as he is called, passes his hand across the clothes seemingly in

the most accidental manner; sometimes twice when he is in doubt. The fact that there is booty being ascertained, the confederates surround him, and wait for the coming-off of a race. Just as the horse is at the winning-post, there is a rush forward of the crowd: of this the mobsmen take advantage, while the victim, perhaps, for better security, keeps his hand over his pocket, but in vain. At a critical moment the man behind tips his hat over his eyes, instinctively he lifts up his hand to set it right, and the next moment his pocket is hanging inside out. Few betting men who attend much at races have escaped being thoroughly cleaned out. It is rarely that Londoners are robbed in the streets; they are too busy, and move on too fast. Country people form the chief game of the light-fingered gentry: as they stare about, they instantly betray themselves to their watchful enemy, and in the midst of their admiration at everything about them, fall an easy prey. The thief in search of purses or handkerchiefs always makes his way trout-like against the stream. There are places, which, to carry out our piscatorial analogy, seem "ground-baited" for these fishers. Temple Bar, St. Paul's Churchyard, the Shoreditch end of Bishopsgate, Holborn, Cheapside, and other crowded thoroughfares, all afford excellent sport for the pickpockets, and any one acquainted with their "manners and customs" may occasionally see them exercising their craft at these localities, if he watches narrowly. They look out for a temporary stoppage in the stream of people, and a horse fallen in the highway, an altercation between a cabman and his fare, a fight, a crowd round a picture-shop, are all excellent opportunities, of which they instantly take advantage.

The May meetings at Exeter Hall, however, form the most splendid harvests for the pickpocket. If the members of the various religious denominations who flock thither escape the hustle on the hall stairs, they are waited upon with due attention in the omnibus. Ladies and gentlemen who attend these May meetings are well known to be "omnibus people:" they lodge or visit, for the short period of their sojourn in town, either at Islington, Clapham, or Camberwell, and the

"Waterloos" and the "Victorias" are followed by the fraternity as certainly as a sick ship in the tropics is followed by the sharks. Omnibuses are generally "worked" by a man and a woman; the woman seats herself on the right-hand side of the most respectable-looking female passenger she can see, and the man if possible takes a place opposite the individual to be operated upon. If she be a young person, the man "stares her out of countenance," and, whilst confused by his impertinence, the "pal," by the aid of a cloak thrown over her arm, or, if a man, by passing his hand through the pocket of his cloak made open on the inside for the purpose, is able to rifle her pockets at leisure. If the victim be a middle-aged or elderly lady, her attention is engaged in conversation whilst the clearing-out process is going on. The trick done, the confederates get out at the first convenient opportunity. It is very rarely that a pickpocket pursues his avocation alone; but a case has been reported lately in the newspapers, which proves that a clever artist can work single-handed. A man named William Henry Barber was charged at the Worship-street court with robbing a lady of her portemonnaie in a Stoke Newington omnibus: he was well known to the police, but had generally escaped by his adroitness. His manœuvres were thus described by a lady, a resident of Stoke Newington, who had been robbed by him on a previous occasion:—

"She had got into an omnibus," she said, "at Kingsland, several weeks back, to convey her to town, and found herself next to a gentlemanly-looking stout man, who was dressed in sober black, with a white neckerchief, and apparently a dissenting minister. The gentleman gradually encroached upon her, and pressed upon her; but she thought nothing of it, as he was very intent upon reading a newspaper the whole way—so intent, indeed, that she did not see his face, and he did not seem to notice that his newspaper several times partially covered her dress. The stranger shortly afterwards got out, and she did so also in a few minutes, and upon then placing her hand in her pocket to make some purchase, she found that her purse had been stolen, and with it seven sovereigns and a quantity of silver."

The "Dissenting Minister" had evidently worked the Stoke Newington road regularly, and no doubt the "sober black" and the white handkerchief were assumed with a perfect knowledge of the "serious" class of passenger he was likely to encounter in

omnibuses running to that suburb. Robberies of this kind have enormously increased of late. The security with which pickpockets can work, withdrawn as they are from the surveillance of the police, is a great incentive to thieves to take to this particular line of business.

The earnings of what is called a "school" of boys, who pick pockets in concert, under the eye of a master, must be considerable; for we were shown, some time since, a bill made out by one of those Fagins for the board and lodging of his hopeful youths, from which it appeared that the regular charge for each was two guineas a week! This person was well known some years since on the Surrey side of the water as Mo Clarke. He attended races, dressed in the deepest black, with his young assistants in jackets and turned-down collars; and the whole group, to the eye of the general observer, presented the sad spectacle of a widower left with a family of young children to lament the loss of an attached mother. Their appearance disarmed suspicion, and enabled them to empty the pockets of those around them at their leisure. The subsequent fate of two of the children, though nursed in hypocrisy and vice, proves that the old saying, "once a thief always a thief," is not invariably correct, for they are at the present moment flourishing cab and omnibus proprietors.

The advantage of working out of sight of the police has lately led some of the swell mob to go to church, prayer-book in hand, and pick pockets either in the pews or while the congregation is coming down the aisle. Women are the greatest adepts at this kind of thieving, and they are constant attendants at confirmations, plundering in sight of the most touching rite of the Church. The dress of these females is perfect enough; but with them, as with most other members of the swell mob, the finish is entirely on the outside; they scarcely ever have any education, and the moment they open their mouths they betray themselves. This fact is of especial service in detecting another large class of thieves—the shoplifters. A lady cannot go into the shop of any silkmercer or linendraper without being struck with the rude manner in which the shopman clears the counter immediately

the purchaser takes her seat. The plundering to which they are subjected is some excuse for their suspicions, for the assistants cannot tell at first who the customer may be, and if expensive goods were left exposed while their backs were turned, serious robberies would inevitably occur. The value of the manner of speech, as diagnostic of character, was exemplified not long since at Messrs. Swan and Edgar's, where a lady-like person asked to look at some "wallenciens." A watch was kept upon the "lady," and she was speedily detected secreting a card of valuable lace.

The extent of pilfering carried on even by ladies of rank and position is very great; there are persons possessing a mania of this kind so well known among the shopkeeping community, that their addresses and descriptions are passed from hand to hand for mutual security. The attendants allow them to secrete what they like without seeming to observe them, and afterwards send a bill with the prices of the goods purloined to their houses. Jewellers' shops are especially open to a class of thieving termed "palming," One of the gang goes in first, and engages the attention of the assistant; then another drops in, and makes inquiries for some article which is on the other side of the shop; then perhaps a third, without recognizing his companions, follows, and asks for something, saying he is in a hurry, as he has to be off by a certain train, and at the same time pulls out his watch to show his eagerness to be served. The shopkeeper's attention is thus diverted from the confederates, who rob the trays before them of their valuable contents. Some of these fellows are so dexterous that, if they perceive any person watching them, they can "palm" back the goods they have secreted, and, on being accused, put on an appearance of injured innocence, which makes the tradesman believe that his own eyes must have deceived him. The higher order of thieves will sometimes "ring the changes," as it is called. This must be ranked among the fine arts of swindling. They will call on first-rate houses, and request to be shown valuable pieces of jewellery, such as diamonds, necklaces, and bracelets, which are kept in cases. Having noted the case, they go away, promising

to call with "a lady." A case exactly similar is then made, with which they call a second time, and ask to see the identical bracelet they before admired, and substituting the empty case for that containing the jewels, depart with an apparent inability to decide upon the purchase. Many robberies to a heavy amount have taken place in this manner. Jewellers are liable to be attacked from without as well as from within. From the narration communicated by a prisoner to Captain Chesterton, when governor of Coldbath-fields prison, we extract the following method of procedure in what is termed "starring the glaze:"—

"One or two parties divert attention while another 'stars.' This is either done by a diamond, or by inserting a small penknife through the putty, near the corner of a pane, and cracking it; the wet finger carries the crack in any direction; an angle is generally formed. The piece is wrought to and through, and then removed; if necessary, another piece is 'starred' to allow of the free ingress of the hand. In a retired neighbourhood an opportunity is taken of tying the door, in order to prevent any one coming out, and on passing of a heavy carriage the hand is driven through a square of glass, upon which has been laid a piece of strong paper, coated with treacle, to prevent noise from the glass falling, and then articles of value are removed. This is termed spanking the glaze. At other times the parties intending to star go a night or two before and break one of the lower squares of glass, a watch is then put upon the shop to know when the square is renewed, which, of course, the putty being soft, can be removed at pleasure; a piece of leather, upon which is spread some pitch, being applied to the square to prevent it falling when pushed in. Much time is saved this way."

We often hear of the march of intellect in thieving, and the height to which its professors have carried it in these latter days. There could be no greater delusion; all the tricks of card-sharpers, ring-droppers, purse-cutters, &c., are centuries old, and it does not appear that they are performed a bit more adroitly now than in the days of Elizabeth. Mr. Charles Knight, in his charming paper on London rogueries, gives examples of the tricks of the Shakspearian era, which prove, as he observes, that pickpocketing in all its forms was taught as cleverly in the days of the Tudors as by Fagin and his boys in "Oliver Twist." His account of a school of thieves discovered in 1585 is an instance:—

"Among the rest they found one Wolton, a gentleman born, and sometimes a merchant of good credit, but fallen by time into decay. This man kept an alehouse at Smart's Key, near Billingsgate, and after, for some

misdemeanour, put down, he reared up a new trade of life; and in the same house he procured all the cut-purses in the city to repair to his house. There was a schoolhouse set up to learn young boys to cut purses. Two devices were hung up—one was a pocket and another was a purse. The pocket had in it certain counters, and was hung about with hawk's bells, and over the top did hang a little scaring bell; the purse had silver in it, and he that could take out a counter without any noise was allowed to be a public Foyster; and he that could take a piece of silver out of the purse without noise of any of the bells, was adjudged a judicial nypper, according to their terms of art."

The tricks we have enumerated all require cunning, lightness of hand, and address, rather than strength and courage. As the swellmobsman stands at the head of this school, so the cracksman or housebreaker stands on the highest pinnacle of the other great division of crime which attains its ends by force and courage. Since the ticket-of-leave system has been in action, this department has flourished to an alarming degree. The released convict re-enters the community with the enlarged experience of the hulks and with a brutal disregard of danger. Suddenly thrown upon his resources, with a blasted character, society leaves him no better means of livelihood than his old course of crime. One fellow who was brought up to Bow-street had committed no less than four burglaries within three weeks after he had been liberated! Bands of ruffians, with crape masks and with deadly arms, stand by the bed at dead of night, and, after robbing and terrifying their victims, leave them gagged and bound in a manner that would disgrace banditti. It is true these burglaries are confined to lonely houses situated in the country; but housebreaking has been on the increase of late even in the metropolis. Some of the craftsmen have become so expert, that no system of bolts or bars is capable of keeping them out. It may be as well to state, however, that a sheet of iron, on the inside of a panel, will often foil the most expert burglars; and all operators of this class who have opened their minds upon the subject to the prison authorities admit that it is totally impossible, without alarming the inmates, to force a window that is lightly barred with a thin iron bar and supplied with a bell. A shutter thus protected, and which gives a little with pressure, will not allow the centrebit to work without creating a motion which is sure to ring the alarum.

Most burglaries of any importance, especially those in which much plate is stolen, are what is termed "put up;" that is, the thieves are in correspondence with servants in the house, or with those that have been discarded. Many robberies that appear to have been accomplished in a most wonderful manner from without, are committed from within. In "put up" robberies, however, the thieves seldom allow the confederate in the house to know when the robbery is to come off, for fear of what is termed a "double plant;" that is, lest the person who originally "put up" the robbery should, from the stings of conscience, or for other reasons, have officers in waiting to apprehend them. It is quite sufficient for adroit burglars to know where the valuables are kept, and the general arrangements of the house. We are indebted to the Yankees for an extremely clever method of gaining entrance to hotel bed-chambers, even when the inmate has fastened the door. The end of the key which projects through the lock is seized by a pair of steel pliers, and the door is unlocked whilst the traveller sleeps in fancied security. Several robberies of this kind have lately taken place. The most ingenious pilfering of the "put up" kind we ever heard of occurred many years ago in a large town in Hampshire. A gang of first-rate cracksmen, having heard that a certain banker in a country town was in the habit of keeping large sums of money in the strong box of the banking-house in which he himself dwelt, determined to carry it off. For this purpose the most astute and respectable-looking middle-aged man of the gang was despatched to the town, to reconnoitre the premises and get an insight into the character of their victim. The banker, he ascertained, belonged to the sect of Primitive Methodists, and held what is termed "love-feasts." The cracksman accordingly got himself up as a preacher, studied the peculiar method of holding forth in favour with the sect, wore a white neckerchief, assumed the nasal whine, and laid in a powerful stock of scripture phrases. Thus armed, he took occasion to hold forth, and that so "movingly," that the rumour of his "discourses" soon came to the ears of the banker, and he was admitted as a guest. His foot once inside the doors, he rapidly "improved the occasion"

in his own peculiar manner. The intimacy grew, and he was speedily on such terms of friendship with every one in the house, that he came and went without notice. He acquainted himself with the position of the strong box, and took impressions in wax of the wards of the locks. These he sent up to his pals in town, and in due course was supplied with false keys. With these he opened the strong box, made exact notes of the value and nature of its contents, and replaced everything as he found it. A plan of the street, the house, and of the particular chamber in which the treasure was kept, was then prepared and forwarded to the confederates in London. He persuaded his kind friend the banker to hold a love-feast on the evening fixed for the final stroke. A few minutes before the time appointed for the robbery, he proposed that the whole assembly should join with him in raising their voices to the glory of the Lord. The cracksman laboured hard and long to keep up the hymn, and noise enough was made to cover the designs of less adroit confederates than his own. The pseudo-preacher, to disarm suspicion, remained with his friend for a fortnight after the theft, and on his departure all the women of the "persuasion" wept that so good a man should go away from among them!

In a large number of cases the servants are only the unconscious instrument in the hands of the housebreaker. We will venture to say that more house robberies are committed through the vanity of servant girls than from any other cause. A smart young fellow, having heard that plunder is to be obtained in a certain house, manages to pick up an acquaintance with one of the female domestics, and makes violent love to her. We all know how communicative young women are to their sweethearts, and the consequence is, that in a short time he gets from her every particular that he requires,—the habits of the family, the times of their going out, the position of the plate-chest, and the fastenings of the doors. Where only a servant of all-work is kept, the process is more simple. The lover calls in the absence of the family at church, proposes a walk, and takes charge of the street-door key, which, unseen to the girl, is passed to a confederate; and whilst the polite lover and his

lass are enjoying the cool of the evening the house is being ransacked. An investigation took place at the Lambeth Police Court a few months ago, where the poor girl who had been made the tool of the housebreaker attempted to commit suicide in order to prevent the consequences of her folly. Her account of the manner in which the "plant" was made upon her, affords a good example of the style of "putting up" a house robbery :—

"The young man with whom she had casually become acquainted called after the family had gone out, and she asked him into the back parlour. He then asked her to dress and go out with him, and he remained in the back parlour while she dressed. While in the back parlour he asked her if she could get a glass of wine, and she told him that she could not, as the wine was locked up. He said it did not matter, as they should have one when they went out, and that he expected to meet his sister at the Elephant and Castle. They then left the house and went for a walk, and on reaching the Elephant and Castle remained there for some time, waiting for the young man's sister, but did not see her. They next proceeded to a public-house, where they had a glass of brandy-and-water, and the young man accompanied her to the end of the street, where they parted, with the intention that they should meet at one o'clock on the following day and spend the afternoon together. On going to unlock the door, she found it ajar, and on going in, found that the house had been robbed. On discovering this, she did not know what to do, but thought she would make up a story about thieves having got into the house, and took up the knife and chopped her hand ; but after this, not knowing how to face her master or mistress after being so wicked, she took up the knife again, intending to kill herself, and inflicted the wound on her throat."

This confession was enough for the officers, and her "young man," with his confederates, were caught and convicted. The frequency of these robberies should put housekeepers on their guard as to what followers are allowed, lest the "young man" should turn out to be a regular cracksman in disguise. We bid the housekeeper also beware of another danger that sometimes threatens him when he has an empty house for a neighbour. Thieves always, if possible, make use of it as a basis of operations against the others. They creep towards the dusk of evening, when the inmates are generally down stairs, along the parapet, and enter successively the bedrooms of the adjoining tenements. As many as half a dozen houses have thus been robbed on the same occasion. Police-constables always keep a careful watch upon these untenanted houses, by placing private marks on some part of the premises ; and if any of these signs

are disturbed, they suspect that something is wrong, and make a further examination. In the City, where an immense amount of valuable property is stored in warehouses, the private marks are much more used than in other portions of the metropolis, and are continually changed, lest they should become known to thieves and be turned to their advantage.

Professional beggars are almost without exception thieves; but as they are generally recruited from the lowest portion of the population, they never attain any of the higher ranks, but confine themselves to petty acts of filching, or to cunning methods of circumventing the honest. The half-naked wretch that appears to be addressing the basement floor in piteous terms, has a fine eye for the spoons he may see cleaning below; and the shipwrecked sailor just cast ashore from St. Giles's would be an awkward person to meet with in a dark suburban lane. Professional beggars are migratory in their habits. They travel from town to town, not in the filthy rags we are accustomed to see them in, but in good clothing; the rags are carried by their women, and are only donned when they are nearing the place in which they intend to beg.

There is an audacious class of thieves, termed "dragsmen," who plunder vehicles. At the West End they chiefly operate upon cabs going to or coming from the railway stations. As this kind of thieving is carried on under the very eyes of the foot-passengers, it is rarely attempted except in the dusk of the evening. The dragsman manages to hang on behind, as though he were merely taking a surreptitious ride, but in reality to cut leather thongs and undo fastenings, and be able at any convenient moment to slip off a box or parcel unobserved. The carelessness of the public is the best confederate of this sort of thief. In the case of Lady Ellesmere's jewels, the box was put not *inside*, but *outside*, the cab in which the valet rode, and not in the middle of other boxes, but the *hindermost* of all—just the place in which the dragsman would have planted it. It is now known that the robbery was effected between Berkeley Square and Grosvenor Square, as a man was seen with the package standing at the corner of Mount Street, Davies Street, bargaining with

a cabman to take him to the City. The man and his booty were driven to a public-house, but the box must have been shifted immediately, for in two hours from the time it was lost it was found rifled of its contents in a waste piece of ground in Shoreditch. It might perhaps for a moment be suspected that this was a "put up" robbery, but we are precluded from adopting this view of the case, as it is, we believe, suspected that the man sold the jewels, which were worth perhaps 25,000*l.*, for a very trifling sum. He must have been entirely ignorant of their value, and having by a chance stroke obtained a magnificent booty, threw it away for an old song. Not many weeks after this extraordinary robbery, a plate-chest of her Majesty was stolen from a van between Buckingham Palace and the Great Western Railway. There were persons walking alongside the vehicle, and it seems marvellous how it could be possible to remove unseen a heavy chest under such conditions; but every facility was given in this case, as in the former, for the plunderers to do their work unmolested. In the first place the box was put in such a position that its bottom came flush with the ledge of the van. Next, the journey from Buckingham Palace to Paddington was, in the driver's idea, too far to go without baiting on the way; therefore bait he did at a little public-house, and every person in charge of the property went inside to drink. According to their own account, they did not stop more than a minute; this minute was enough: like Laertes, the thief might have said, "'Twill serve." In this instance also the box was found empty in a field at Shoreditch, and it is believed that a ticket-of-leave man had a hand in both robberies.

The habits of thieves have been somewhat modified since the institution of the new police, and the adoption of the principle of prevention instead of detection, in dealing with the criminal population. In the time of the old Bow-street Runners the different classes of thieves had their houses of call, in which they regularly assembled. The arrangement was winked at by the magistrates, and approved by the officers, as useful to them in looking after offenders that were wanted. John Townsend, when speaking of the supposed advantage of these flash houses,

said, "I know five-and-twenty, or six-and-twenty years ago, there were four houses where we could pop in, and I have taken three or four, or five or six of them at a time, and three or four of them have been convicted, and yet the public-house was tolerably well conducted too." Perhaps officers who lived upon the capture of thieves had good reason for maintaining these flash houses, in which most robberies were concocted; the case is far different now that the police are paid by day rather than by piece-work, by weekly salary rather than by blood-money, and all known flash houses have long been discontinued. Some fifteen years since a few remained in the Borough, but Superintendent Haynes broke them up, and rooted them out. Thieves cannot meet now in respectable houses, for if they did, the constables would become aware of the fact, and the landlord would speedily lose his license. The passing of the Common Lodging-house Act has also assisted in dispersing the desperate gangs, one of which, known under the name of "The Forty Thieves," infested the town a few years since. It may be asked, what sort of mutual fellowship exists among these outcasts who live below the surface of "society"? Of the seven or eight thousand thieves in the metropolis, very few are acquainted with each other; they are, in fact, divided into as many sections as are to be found among honest men. Beyond their own peculiar set they do not associate with their kind. The swell-mobsman is as distinct a being from the cracksman as a Bond-street dandy from a South-Sea islander; they do not even talk the same slang, and could no more practise each other's art, than a shoemaker could make a table. These natural divisions of the underground world of rogues immensely facilitate the operations of the police. The manner in which they do their work is also in some cases a pretty good guide to the detectives. Skill and individuality is evinced in unlawful as well as in lawful pursuits—in the manner in which a door is forced, as much as in the style a picture is painted; and a clever officer, after carefully examining a door or a window, will sometimes say, "This looks like 'Whiteheaded Bob's work,'" or "'Billy-go-Fast,' must have had a hand in this job."

The leading swell-mobsmen are the only class of thieves who "touch," if we may term it, the ordinary society of better men. The practitioner in this line must dress and be as much like a gentleman as possible, in order to pursue his avocation without suspicion. Accordingly, he lives with a woman, who passes for his wife, in genteel lodgings, and generally in the drawing-room floor. As his earnings are often very large, he has everything about him of the most expensive kind; his style of living is luxurious, and he drinks nothing less than hock and champagne. He sometimes keeps a banking account, and one man named Brown, lately apprehended, had a balance at his banker's of 800*l.*! As the members of this fraternity work wholly in the daytime, going out in the morning and returning in the evening, the landlady believes that they are engaged in mercantile pursuits, and have business in the City; and, as it is part of their game to pay their way liberally, she esteems them to be model lodgers!

The domestic habits of thieves are all pretty much alike; fluctuating between the prison and the hulks, they exhibit the usual characteristics of men engaged in dangerous enterprises. They mainly pass their time, when not at "work," in gambling, smoking, and drinking, and in listening to the adventures of their companions. It must be remembered, however, that the professed thief, even if he drinks, is never *drunk;* he is employed in desperate undertakings which require him to have his wits about him quite as much, if not more than the honest man. When a pickpocket is flush of money, he spends it in the most lavish manner,—takes a tour with his female companion to the Isle of Wight, or to any other place he has a wish to see, and puts up at the best hotels. In some of these trips he thinks nothing of spending 30*l.* in a fortnight, and when the money is gone he comes back again "to work." Thieves are generally faithful to each other; indeed the community of danger in which they live develops this virtue to an unusual extent. If a "pal" is apprehended, they cheerfully put down their guinea apiece to provide him with counsel for his trial; and if he should be imprisoned, they make a collection for him when he

comes out A curious circumstance is the rapidity with which news of any of the body having been arrested travels among his companions. We are assured that no sooner is a young thief captured and taken to the station-house, although he may have been plundering far away from his home, than some associate brings him his dinner or tea, as a matter of course.

The best class of swell-mobsmen sometimes act upon the joint-stock principle "with limited liabilities." When a good thing is in prospect—a gold-dust robbery or a bank robbery—it is not unusual for several of them to "post" as much as 50*l.* apiece in order to provide the sinews of war to carry on the plan in a business-like manner. If in the end the job succeeds, the money advanced is carefully paid back to the persons advancing it—several of whom have lived for years on plunder thus obtained, without the police being able to detect them. Often the receivers make these adventures in crime, and plot the robbery of a jeweller's shop with as much coolness and shrewdness as though it were an ordinary mercantile speculation, and the produce is disposed of in the same business-like manner. Watches are what is termed "re-christened," that is, the maker's names and numbers are taken out and fresh ones put in; they are then exported in large quantities to America. All articles of plate are immediately thrown into the crucible and melted down, so as to place them beyond the hope of identification. In many cases, when the receiver cannot thoroughly depend upon the thief, it is, we believe, customary to employ intermediate receivers so as to render it impossible to trace the property to its ultimate destination. It must not be supposed that the passion for gain is always the sole incentive to robbery. "Oh, how I do love thieving! If I had thousands, I'd still be thief;" such were the words uttered by a youth in Coldbath-fields Prison, and overheard by the governor.*

If the machinery for preventing and detecting crime has so vastly improved within this present century, the same may be

* We have extracted this anecdote from the very interesting work published by Captain Chesterton, entitled "Revelations of Prison Life."

said for the method of dispensing justice. Up to as late as 1792, the magistrates of Bow-street—the first "police-office," as it was then termed—were paid in that most obnoxious of all modes, by fees, which were often obtained in a manner so disgraceful that the magistrates got the name of "trading justices" and "basket justices." Our old friend John Townsend, whom we must summon once more to our aid, gives an insight into their proceedings, and he knew them well. He said, "The plan used to be to issue warrants, and to take up all the poor devils in the streets, and then there was the bailing them, 2*s.* 4*d.*, which the magistrate had. *In taking up a hundred girls*, that would make, at 2*s.* 4*d.*, 11*l.* 13*s.* 4*d.* They sent none to jail, *for the bailing them was so much better!*" The old Bow-street worthy then draws a picture of the magistrate settling the amount of these ill-gotten fees with his clerk on the Monday morning. The "basket justices" were so called, because they allowed themselves to be bought over by presents of baskets of game. These enormities were so glaring, that, according to Townsend, "they at last led to the Police Bill, and it was a great blessing to the public to do away with these men, for they were nothing better than the encouragers of blacklegs, vice, and plunderers. There is no doubt about it." In 1792 seven other "offices" were established, namely, Queen-square, Great Marlborough-street, Hatton Garden, Worship-street, Lambeth, Shadwell, and Union-street, each office having three magistrates, who did the duties alternately. These, by the addition of the suburban courts, have since been augmented to eleven. They form the judgment-seats to which all offenders in this great capital of 2,500,000 inhabitants are brought, either to be punished summarily, or to be remanded to the sessions to take their trial.

The police-courts may be likened to so many shafts sunk in the smooth surface of society, through which the seething mass of debauchery, violence, and crime, are daily bubbling up before the public eye. A spectator cannot sit beside the magistrate on the bench for a couple of hours without feeling that there are currents of wickedness flowing among the population as

fixedly as the trade-winds in the tropics. A panorama of sin passes before his eye which he shudders to think is only like a single thread drawn from the fabric of vice which underlies the whole system of elegant, punctilious, and accomplished metropolitan life. On every case that comes before him the magistrate unassisted has to decide rapidly and justly, unless he desires to call down upon his head the thunders of an ever-watchful press. In addition to his judicial duties, he has to answer numberless questions, and to give advice upon law points to distressed persons: and all this amid a pestilential atmosphere which is calculated to depress both body and mind. Nevertheless, the work is done admirably, and justice, as speedy as that dispensed by cadis in Eastern tales, and much more impartial, is dealt to the throng brought before him.

From an analysis of the Criminal Returns of the Metropolitan Police, it is apparent that crimes have their peculiar seasons. Thus attempts to commit suicide generally occur in the months of June, July, and August, and rarely in November, according to the commonly accepted notion; comfort, it is evident, is considered even in the accomplishment of this desperate act. Common assaults and drunkenness also multiply wonderfully in the dog-days. In the winter, on the contrary, burglaries increase, and, for some unknown reason, the uttering of counterfeit coin.

The character of the cases brought before the police-courts varies, in some degree, according to the neighbourhood and other causes. Bow-street still maintains the pre-eminence over the other courts which it exercised in the old days, when the horse-patrol and the detective police, known as the Bow-street runners, were in existence; and this it does in consequence of its special jurisdiction over persons who are amenable to foreign law. The cases of this class—arson, murder, or bankruptcy—are heard in private, generally by the chief magistrate, and the depositions are forwarded direct to the Foreign Office. Ticket-of-leave men who have committed fresh offences, are here deprived of their tickets and apprehended by a warrant from the Home-Office. All Inland Revenue and Post-Office cases,

such as stealing from letters, are adjudicated upon exclusively at Bow-street, which is, in fact, *the* Government office.

The Thames police deals with mutinies and murders committed on the high seas, and all disputes under the Mercantile Marine Act come as a matter of course to this court, together with the major portion of the criminals, the scene of whose offences is in the docks and on the river. Drunkenness, the vice of the sailors, and the insubordination arising out of it, form a very large portion of the charges of the district. Worship-street is famous, or rather infamous, for wife-beaters. The reason is curious, and supplies a hint to philanthropists to reform the dwellings of the poor, rather than pass harsh acts of parliament against the husbands, which in many cases only serve to aggravate the evils arising from their brutality. The majority of the wife-beaters come from Bethnal-green, where there are a great number of large old mansions let out to the working-classes in floors or flats. Sometimes as many as twenty families live in the same house. The children play about in the passages as a neutral ground, disputes arise, and the mothers take the parts of their respective offspring with discordant fierceness. This drives the men to the public-houses, where they drink their porter *iced* and listen to more pleasant sounds in the shape of gratuitous concerts. The wives in turn are driven to the tavern doors to seek their mates, with words not too conciliatory, and are brutally assaulted by the drunken husbands, who are taken up the next day and get six months' imprisonment, *the family being in most instances irretrievably broken up and ruined thereby.* Some of the magistrates, seeing the baleful working of the system, have attempted a solution of the difficulty by making the husband promise to allow the wife to receive his weekly wages from his master, whose consent to the arrangement has been given. In many instances this plan has worked well, since the husband knows that on the slightest infringement of the agreement his spouse may give him six months' imprisonment, judgment in the case having been only suspended. But this power, again, is often abused by the woman, and it is a common thing for them on the least

threat of their mates to say, "Mind what you are about, or I will give you 'a sixer.'"

Cases of begging are principally heard at the Marlborough-street police-court, as the rich streets in its neighbourhood are the main scenes of the nuisance. Blind beggars especially affect Regent-street, Oxford-street, and Piccadilly, the most thronged thoroughfares in the West End. We warn our readers against their charitable tendencies for these people. If the truth was known, the cry, "Pity the poor blind!" far from exciting their pity, would arouse their disgust. Blind beggars, as a class, are the most profligate scoundrels in the metropolis, thinking of nothing but their grosser appetites, and plundering the charitable for their satisfaction. One of these men lately taken into custody was discovered seated at the breakfast-table with ham and fourteen poached eggs before him! At the Westminster police-court the foot-guards are continually visitors against their will; but it is remarked as extraordinary that not one of the horse-guards has been charged here for years.

A custom has grown up of making the police magistrates the almoners of the public in cases which have attracted the attention of the charitable through the medium of the press. Many a poor forsaken creature has suddenly found himself not only famous, but comparatively rich, by the simple process of telling his tale in one of these courts. The news of it flies through the country in the pages of the *Times*, and in the course of two or three mornings the magistrate is oppressed with post-office orders for the benefit of the sufferer, the donors simply requesting that their gifts should be acknowledged in the public journals. The annual receipts at the different courts for special cases must amount to a large sum; and there is in addition a constant flow of small sums towards the poor-box, the contents of which are distributed at the discretion of the magistrate. The annual income from this latter source is about 300*l.* per annum at Marlborough-street, and at Bow-street respectively, the greater portion of which is given to deserving objects whose cases have come before the court, and the remainder is dispensed at Christmas to the poor of the neighbour-

hood in the shape of coals and candles. We are particularly anxious to make this fact known, in order that the charitable may be aware that their gifts are well bestowed. The magistrates do not, we believe, encourage these donations, as they consider that the distribution of alms is incompatible with their office; but, on the other hand, it cannot be denied that a vast amount of temporary aid is thus given to persons whose needs cannot be satisfied by the union workhouse. Deserving people are often furnished with the means of obtaining a livelihood, workmen whose tools have been burned in a conflagration supplied with new ones, and in some cases women left behind by their husbands, under circumstances of peculiar hardship, have been provided with a passage to Australia. The thousands in England who only want to know where genuine misfortune exists to hasten to its relief, have a greater guarantee that they will not be imposed upon by these cases at the police-courts than by private solicitations, as the magistrates have the means of sifting the statements of applicants. Nevertheless, even these astute public servants are now and then deceived, and comparatively large sums have been received by them for persons who have afterwards been ascertained to be unworthy of relief; and in instances where the discovery took place in time, the money, by the direction of the donors, has been transferred to truer objects of charity.

The fees, penalties, and forfeitures received at the eleven metropolitan police-courts and by the justices of the exterior police districts are very considerable; in 1855 they amounted to 11,315*l.* 16*s.* 6*d.* This sum goes towards defraying the expenses of the courts, which, together with the salaries of the officers, and other items, amounted in the same year to 63,021*l.* 0*s.* 5*d.* The expenditure may be considered reasonable, when it is remembered that 60,000 cases are annually disposed of, many of which require a minute knowledge of statute and of common law. The chief improvement required is the improvement of the buildings. The Thames police-court is the only one at all suitable for its purpose. An enclosed yard is attached to it, in which the police-van can draw up and discharge

its prisoners without exposing them to the public gaze, an important point in times of public excitement. Clerkenwell and Westminster are the next best-arranged courts, but both want space and air; Lambeth, though lately built, is a complete failure; many of the other courts are held in small private houses; and in those of Marlborough Street and Hammersmith, the business is transacted up stairs. In the latter court it is a common thing to hear it said of persons who have been taken before the magistrates—"he has been up the forty steps." With the common people, with whom these institutions have mainly to deal, justice should be dispensed with regard to appearances; there should be the formality of the superior courts, and somewhat of their show. A magistrate sitting in a plain black dress like an ordinary gentleman, and a lawyer dispensing justice in his wig and gown, are two very different things to the lower classes, whatever they may be to educated persons; and the want of all official costume, and the huddled style of doing business, inseparable from the present confined space, is not calculated to inspire the people with much respect. The police should at least be put upon a level with the county-courts. The latter have to deal with less momentous interests. Questions of paltry debt cannot be put in comparison with questions involving the liberty of the subject; the power of committing to prison for six months with hard labour is far more important than that of adjudicating in money disputes under five pounds. It is not enough that justice is administered; it is the opinion which the people have of it that produces the effect, and until the judgment-seat is rendered dignified, and those who sit on it are clothed with the habiliments which distinguish the magistrate from the man, the law, by losing most of its impressiveness, will lose its moral power over delinquents. The vulgar terror of punishment may remain, but the lesson which is conveyed to the feelings by the solemn stateliness of the tribunal is entirely gone.

MORTALITY IN TRADES AND PROFESSIONS.

It is but natural to suppose, that in such a busy hive of industry as England, where so large a proportion of the population—at least one-half—is engaged in the prosecution of arts and manufactures, that the effects of unceasing toil, and the debilitating influences of many employments, will have a certain effect upon the health and longevity of the artisan. We cannot pit the tender muscles of the child against the senseless energy of steam, without producing a strain upon the vital principle of the workers which must be highly injurious to it. We cannot consign a population as large as that of many German States to live perpetually in the bowels of the earth, without being prepared for an increased death-rate. The hundreds of diverse manufactures and handicrafts, which make the land hum with labour, must all be prosecuted under circumstances more or less inimical to perfect health. If we take the agricultural labourer of the better class, whose daily toil is performed under the roof of heaven, it must be clear that all trades which pursue their monotonous vocations in the crowded workshops of crowded cities, in constrained attitudes, and subject to debilitating emanations, must, to a certain extent, fall short of his standard of health. Nevertheless, we do not think the public are prepared for the state of things which a close examination of the sanitary condition of certain portions of the working population divulges. Accustomed to be furnished with all the appliances of easy life and luxury, the great middle and upper classes have never perhaps given a

thought as to the manner in which these wants and appliances are supplied. Accustomed to sip the honey, it never strikes us that perhaps its product involves in some cases the life of the working-bee. Yet the lady, who, from the silken ease of her fauteuil, surveys her drawing-room, may learn a lesson of compassion for the poor workman in nearly every article that lies before her. Those glazed visiting cards, if they could speak, possibly could tell of the paralyzed hand that made them; that splendid mirror, which lights up the stately room, has, without doubt, reflected the trembling form of the emaciated Italian artificer poisoned with mercurial fumes; those hangings, so soft and delicate, may have produced permanent disease to the weaver, whose stomach has been injured by its constant pressure against the beam; the porcelain vase on the bracket has dragged the "dipper's" hand into a poison that, sooner or later, will destroy its power, and, may-be, produce in him mania and death; nay, the very paper on the walls, tinted with all the vernal brightness of spring, has, for all we know, ulcerated with its poisonous dust the fingers of the hanger. The history of the manufacture of almost every article of elegance or *virtù* would disclose to us pictures of workmen transiently or permanently disabled in the production of them. All this suffering—much of it totally preventible—goes on without complaint, the workman falls out of the ranks, and another instantly takes his place, to be succeeded perhaps by a third. We are convinced that such a waste of health and life could not be endured, if the public were fully alive to the magnitude of the evil; for this reason we shall endeavour, in the following essay, to give a true picture of what may, perhaps, without pedantry, be termed the pathology of industrial occupations and professions in this country.

Foremost among those artisans who suffer from the inhalation of dust and other gritty particles given off in the pursuit of their employment are the grinders of Sheffield. Dr. J. C. Hall, in a series of papers published lately in the *British Medical Journal*, draws a picture of the condition of these unfortunate men, which is indeed appalling, and without doubt

gives them the bad pre-eminence of pursuing the most deadly trade in existence. Grinding is divided into dry, wet, and mixed; that is, the various articles of steel turned out of the cutler's shop of Sheffield are subjected to the stone entirely dry, revolving in water, or to processes involving both methods. Of the three, the former is by far the most deadly: forks, needles, brace-bits, &c., are ground entirely on the dry stone, and the amount of finely-divided metal dust and siliceous grit given out in the process may be imagined, when we state that a dozen of razors, weighing 2lb. 4oz. as they come from the forge in the rough, lose in the process of "shaping" on the dry stone, upwards of five ounces, and the stone itself, seven inches in diameter, would be reduced one inch. To receive the mixture of stone and steel thus rapidly given off, the position of the grinder is but too convenient; straddled across his "horsing," as the frame in which the grindstone revolves is called, with his knees bent in an acute angle, his body inclined forwards, and his head hanging over the work, his mouth is brought into fatal contact with the poisonous dust, and his eyes with the rush of the sparks. Fork-grinding is performed entirely on the dry stone, and consequently it is the most deadly occupation pursued in Sheffield. About 500 men and boys are at present devoting themselves to destruction during the period of early manhood, for the benefit of the users of steel forks. "The silver fork school" imagines perhaps that these vile appliances have long been banished to the same limbo as snuffers, and will be surprised to learn that more steel forks than ever are thus fashioned in Sheffield, and the poor grinder, as he receives into his lungs the products of the fashioning, in his own person exemplifies the awful passage in the burial-service—"dust to dust"—as the disease thus induced cuts him off at the average age of twenty-nine years! "I shall be thirty-six years old next month," remarked a grinder, pathetically, to Dr. Hall, "and you know, measter, that's getting *a very old man* in our trade." Another operation, almost as deadly as fork-grinding, is that of "racing the stone." These grindstones are but roughly reduced to the circular form by the

quarrymen, and the grinder undertakes the business of reducing and removing all their asperities, which he does by revolving them against a piece of steel—a tremendous dust being given off in the process. In wet grinding, which is employed in the manufacture of saws, files, sickles, table-knives, and edge-tools, comparatively little dust is made, and in these employments the grinders enjoy comparatively longer life; their average age ranging from thirty-five to forty years. In addition to the destructive effects of these particles of metal and stone upon the delicate membrane of the lungs, the dry-grinder is subjected to serious injury of the eyes from the red-hot particles of steel thrown off in the shape of sparks. The more careful of the workmen protect themselves from the danger, however, by wearing large spectacles of ordinary window glass. These spectacles, when they have been in use a little time, give practical evidence of their utility, for on examining them they are found to be speckled all over with the particles of steel, which, when red-hot, become embedded in the glass.

In the rough nomenclature of the trade, the disease which thus early destroys the fashioner of forks and needles is termed the *grinder's rot.* The lung, when examined after death, looks as though it had been dipped in ink, and the texture, instead of exhibiting the usual spongy character of that organ when in health, cuts like a piece of india-rubber! The colour and the solidification of the dry-grinder's lung is owing to the chronic inflammation to which it has been subjected by the presence from an early age of irritating particles of steel and stone within its finest air passages. But why dry-grind at all, the reader will involuntarily exclaim, if the wages of the occupation are death? The grinder replies, that there are certain operations which cannot be done on the wet stone; giving the rounded back to razors, technically called "humping," and the rounded side to scissors, are quoted as examples. The pressure during the process of shaping is so great, that the rolling friction would speedily make the stone wear, and the workman would be unable to hold the blade upon it. Then, again, we may ask, where is the necessity for this rounded form—would the shaver

on a cold morning care a jot whether his razor had a round or a square back? Would the lady, as she manipulated her lace-work with her scissors, hesitate to accept a three-sided scissor-leg in place of a half-round one, if she knew that the difference involved the life of a fellow-creature? Yet such trifling differences as these between round and flat, stand in the way of the health or misery of an entire class of workers! We give a list of the average duration of life of artisans in steel in Sheffield:—Dry-grinders of forks, 29 years; razors, 31 years; scissors, 32 years; edge-tool and wool-shears, 32 years; spring-knives, 34 years; table-knives, 35 years; files, 35 years; saws, 38 years; sickles, 38 years—the ascending longevity being in proportion to the amount of water used on the stone, and to the greater amount of adult labour employed; such articles as saws, sickles, and tools are happily too heavy to be manipulated by the children employed, and thus early diseased in the manufacture of the lighter articles.

The only relief to be gathered from this dismal picture of wasted life, is the fact that things are not so bad as of old. By means of greater speed being given to the stone, many articles, such as pen and pocket-knives, are now ground with a wet stone that formerly were ground with the dry; and happily much of the dust has been abolished in the best shops, such as that of Messrs. Rodgers, by the introduction of fans on the principle of a winnowing-machine, which blows the dust and grit as it comes from the grindstone clear away through a flue placed in connection with the chimney. This fan is, however, only partially used; the grinders themselves, whom they are intended to benefit, complaining that the "trade is bad enough as it is, and if men lived longer, it would be so over-full that there would be no such a thing as getting a living:" the same spirit rejected Mr. Abraham's mask of magnetized wire, invented many years ago for the same object. There can be no doubt, however, that intelligence should rule in this matter, and that the Legislature should make it a fineable offence to work a dry stone without a fan, just as it is to work dangerous machinery without guards; for where one life is lost by neglect

in the latter case, thousands sink into a premature grave in the former. Grinders, wet or dry, may also protect their lungs, in a most remarkable manner, by simply allowing the beard and moustache to grow. The hirsute appendages of the upper lip and chin are Nature's respirators, and it has been observed that those men who have allowed her in this respect to have her way, have discovered that she is somewhat wiser than fashion or popular usage.

Of those artisans exposed to irritating dust, probably miners take the second place after the miserable dry grinders. If we investigate the condition of these men, we are immediately struck with the lamentable conditions under which they labour, and astonished at the endurance and patience with which they submit to toil to which that of the well-fed, well-housed felon is pleasant pastime. There are at present upwards of 300,000 human beings acting the part of gnomes for the good of the community at large, entering day by day into the bowels of the earth, and emerging in the evening. Of human life they see as little as the train of black ants we watch emerging from their holes in the ground. Yet the miner is the industrial Atlas of England. Were he to cease to labour, this busy hive of men would speedily be hushed, and the giant limbs of machinery, which now do the drudgery of the world, become as still as the enchanted garden of the fairy tale ere the advent of the prince. Without the coal and the iron, the copper and the tin, they toilfully evolve from vast depths, England would be but a third-rate power. A life so cheerless, and yet so useful—nay, essential, to our national existence—should at least receive at the hands of the Government every protection that can be thrown around it; yet, if we follow the miner into his gallery and working cell, we are amazed at the dangers and the difficulties which are needlessly thrust upon him in the black realm in which he moves and has his being. Let us take the collier, for example. In many pits in the West of England, the seams of coal are not more than twenty or twenty-five inches thick; and inasmuch as the object of the worker is to remove the coal with as little as possible of the surrounding soil, he often drives his working

to a considerable distance through an aperture not more than, and often not so much as, two feet high. If our adult male reader will condescend to squat himself on the floor, *à la Turque*, say under the dining-table, for instance, and then picture to himself the inconvenience of picking with an axe the under side of the prandial mahogany for twelve hours, he will obtain some slight idea of the muscular knot into which the poor collier has to tie himself, for the whole term of his working life, having to use violent exercise throughout. Can it be wondered at that, under such circumstances, the Apollo-like form of man becomes permanently twisted and bent, like the gnarled root of an oak that has been doubled up in the fissure of some rock? If we look at a collier, we see instantly that his back is curved, his legs bowed, and the extensor muscles of his calves withered through long disease. He has knotted himself so long, that the erect position of his race becomes a punishment to him. It is credibly related that a number of colliers, having been sentenced to imprisonment in Wakefield jail, with hard labour, the only complaint they made was, that they were obliged, whilst at work, to keep the ordinary posture of rational creatures. But confined space is only one of the many evil conditions under which they labour. In the majority of cases the collier works in foul air; for, notwithstanding all the official inspection, the ventilation of mines is still execrable. The fire-damp either blasts him into a cinder, or the choke-damp noiselessly blots out his life. However good, moreover, the general system of ventilation in a mine, unforeseen accidents will happen at any moment. The pick of the collier strikes into the gallery of an old pit, where carbonic acid gas has been gathering perhaps for a century; and the poisoned air rushes in and does its work in an instant; or a sudden invasion of carburetted hydrogen, disengaged by the fall of a mass of coal, meets the miner, who is working, perhaps imprudently, with a naked candle;—and an explosion follows which crowds the pit's mouth with a wailing multitude of newly-made widows and orphans.

Upwards of 1,500 lives are annually lost, principally through these causes, and not less than 10,000 accidents in the same

period testify to the dangerous nature of the miner's occupation, notwithstanding the strict Government inspection.* It is humiliating to know that England is yet far behind continental nations in her methods of preventing these dreadful catastrophes. Mr. Mackworth, in his lecture at the Society of Arts, stated that the mortality from accidents was, in the coal mines of

	Killed Persons.
Prussia . . .	1·89 per 1000 per annum.
Belgium . . .	2·8 ,,
England . . .	4·5 ,,
Staffordshire . .	7·3 ,,

This comparison, so humiliating to England, cannot be explained by the superior adventure of our countrymen, inasmuch as the production of coal in Belgium is half as much again per acre of the coal-field as in England. It is not, however, to the dramatic accidents of coal mines which every now and then startle the community, to which we wish to draw attention; but rather to the silent progress of disease, which makes his death so premature, and his life so miserable. In addition to his cramped condition, whilst at work, his supply of oxygen is small; for in all probability the air supplied to him has to circulate many miles through the mine, and to pass over the excrementitious deposits of man and horse, and the decaying woodwork of the mine, ere it finally reaches him, in enfeebled streams, in his solitary working cell. Long deprivation of solar light, again, tends to impoverish his blood, to blanch him, in short, like vegetable products similarly deprived of the light of day. It is through the lungs, however, that the health of the miner is principally attacked. The air of a coal mine (such as it is) holds a vast amount of coal-dust in mechanical suspension, and this, as a matter of course, is constantly passing into the lungs of the miner. The proof of this is the so-called "black spit" of the collier, which, on being subjected to the microscope, is found to consist of mucus, filled with finely divided particles of

* Since the above was written, the attention of Government has been drawn to the condition of our mines, and a commission of inquiry will speedily, we hear, be appointed.

coal. The permanent inhalation of such an atmosphere results in what is termed the "black lung." The breathing apparatus of the collier becomes clogged, in short, with coal-dust, and after death it has the appearance of being dipped in ink. A writer,* who has lately investigated this singular pathological condition, thus gives his experience of two *post-mortem* examinations :—

"In each case, the black treacly fluid obtained by thus cutting the various portions of the lung (more especially the posterior and inferior portions of the lower lobes), and by slitting up the bronchial tubes, was evaporated to dryness, and the residuum being broken up and subjected to a red heat in a porcelain tube retort, behaved precisely as coal under similar circumstances, *i.e.* it evolved a smoke-like gaseous product, which, on being slightly condensed, deposited hydro-sulphide of ammonium and coal tar, and being thus purified, burnt in all respects like the well-known compounds of the two carbides of hydrogen (common gas)."

Dr. Gregory, of Edinburgh, many years since, by destructive analysis, came to the same conclusion respecting the carbonaceous nature of this deposit. The presence of this foreign body in the lungs leads to the whole train of pulmonary diseases. Asthma, bronchitis, and pneumonia are but too frequent, and we are consequently not surprised to hear that the aggregate amount of sickness experienced by this class, for the period of life from twenty to sixty, is 95 weeks, or 67 per cent. more than the general average.

Rheumatism, leading to heart disease, is another very common complaint of the miner. Indeed, all the conditions of ill-managed mines seem ready prepared for the propagation of this disease. When mines are driven to any considerable depth, the temperature proportionably increases, and 80 degrees of Fahrenheit is a common temperature at the end of workings, all the year round. After exposure to this oppressive atmosphere during the whole day, the collier perhaps suddenly emerges into the open air at the pit's mouth, vitally depressed by his prolonged exertion, when the bitter wind is shaving the surface of the earth at a temperature much below freezing point. In the coal-field stretching from Valenciennes to Aix-la-Chapelle, the mines are made conspicuous a long way off by the presence of huge buildings, which enclose the machinery and the top of the

* W. T. Cox, Esq., in *British Medical Journal.*

pit. In these buildings apartments are prepared in which the colliers change their clothes before and after labour, and wash themselves in baths filled with hot water from the steam waste-pipe. The importance of this sanitary precaution is very great, inasmuch as colliers, like chimney-sweeps, are subject to a skin disease, in consequence of the begrimed condition of their skins. Lady Bassett has established these baths, we understand, at her mines at Camborne, in Cornwall; but we think that the enforcement of a sanitary act of such importance should not be left to the philanthropic tendencies of individuals, but should be required by the Government. If a provision of this kind were made compulsory, and stricter legislation with respect to ventilating mines were established, no doubt a vast amount of disease could be eliminated. It is estimated that the worst coal mines can be ventilated thoroughly at a cost of one penny per man per day, and that in well-constructed furnaces the consumption of one ton of coals per day at the bottom of an up-cast shaft will enable each collier to cut one ton of coals more per day with the same amount of exertion. Such being the case, there can be no excuse for asphyxiating the miners wholesale. Those proprietors of mines, who are only open to these breeches-pocket appeals, should know that it is their interest, in a pecuniary sense, to ventilate well, inasmuch as the preservative effect of pure air upon the wood brattrices, which form so expensive an item in mining, effects a saving of 80 per cent.

Our remarks hitherto have been directed entirely to coal mines and colliers, as these are by far the most extensive industrial occupations of the kind. The metalliferous mines, such as the tin and copper mines of Cornwall, and lead mines of Derbyshire, are in pretty much the same pestiferous condition, but in one particular they are still more destructive of life than coal mines. In the latter the tired workman is lifted from the depths of the mines to the surface by a rope. The Cornwall miner, on the other hand, has to carry his exhausted body in some cases thousands of feet up a series of steep ladders to the mouth of the mine. It has been estimated that many

miners have thus to make an exertion every night equal to climbing to the summit of Cader Idris, and this in an up-cast shaft used for the extraction of the foul air! The disastrous effect upon the already weary miner has long been known, yet in only a few of the great mines of Cornwall has the tireless arm of the steam-engine been called in to save him from this unnecessary labour. The machinery used is called a man-machine, and differs entirely from that employed in coal-pits. In place of a rope, a beam of wood or iron descends through the whole length of the shaft; this beam, at regular intervals of ten feet, has little platforms attached to it, sufficient to afford standing-room to a miner; at the sides of the shaft are similar platforms, at the same intervals. At every stroke of the engine the beam ascends or descends through the space of ten feet, consequently the miner has only to step from the fixed platform to the moving one to be lifted ten feet every time it ascends. In this manner as many as a hundred men are lifted at the same time several thousand feet in a few minutes, without any more exertion than is necessary to make a few score steps. This curious invention has materially benefited the miner, and where it is used there is a manifest absence of the heart disease, induced by the climbing of interminable ladders placed in an almost vertical position.

Dr. Greenhow, in his report on the prevalence of certain diseases in different districts of England and Wales, very clearly proves the deleterious nature of the lead-miner's employment by the comparisons he makes between the death-rates of the men and women of Reeth and Alston, which are purely lead-mining districts. In the former, the lead-miners die at the rate of 2,037 per 100,000 of all ages, whilst their wives, sisters, and daughters, who are variously employed, die at the reduced rate of 1,711 per 100,000; in other words, lead-mining in this one typical district caused an excess of no less than 3·26 deaths in every 100,000 inhabitants; and if we make a comparison relative to the prevalence of pulmonary disease between the two sexes, above the age of twenty, we find the death-rate of the men is double that of the women. The evil

influence of copper-mining on the male population is not quite so marked, but still it is apparent enough. Thus, in Redruth, in which this kind of labour is exclusively carried on, we find that in every 100,000 of population, 220 males die from pulmonary disease more than females; and in Penzance, which is exclusively a tin-mining district, the superior waste of male over female life, in the same population, of all ages, is 104.

The mason, like the miner, is particularly liable to suffer from the presence of irritating substances in the lungs. It has been asserted that in Edinburgh members of the craft rarely live more than fifty years. This is doubtless owing to the nature of the material they work upon. There is great reason to suppose that the degree of damage done to the delicate air-cells of the lung is to be measured by the nature of the particles inhaled. Thus, the ragged portions of granite detached by the chisel are much more likely to do harm than the less irregular dust of the bricklayer. In this manner we can account for the high rate of mortality said to exist among the masons of our northern metropolis. The scourers in the potteries exercise their fearful trade in an atmosphere loaded with pulverised flints, a mineral dust of the most distressing character: we are not surprised, therefore, to hear that in this process pulmonary disease is still more rampant than among the Edinburgh masons, and is little inferior to that of the dry grinders of Sheffield, who receive into their lungs jagged particles of steel as well as grindstone dust.* It will be unnecessary to consider all the

* A just appreciation of the value of life is, perhaps, of more importance to Friendly Societies than to Insurance Offices, inasmuch as the range of sickness in the working classes is much more extensive than in the upper and middle walks of life. Mr. Hardwick, in his manual on enrolled Friendly Societies, has pointed out the fact that the vast majority of these societies are based upon calculations which must in the end terminate in their bankruptcy: and among the causes which tend to this disastrous result he mentions the total disregard evinced in these clubs to a proper estimate of the states of health in different occupations and localities. It must be clear that the potter, whose average amount of illness between the ages of 20 and 70 is more than 333 weeks, obtains a very unfair advantage over clerks or schoolmasters who may happen to be in the same club with him, and whose average of sickness during the same period is only 48 weeks. The dyer, again, who, under the present system of management of Friendly Societies, may be admitted to a club on the same terms as a wheelwright,

trades which are affected by dust, inasmuch as the artisans employed in them are similarly subjected to pulmonary affections, if not in a like degree. Thus millers are rendered consumptive and asthmatic by the floating meal of their mills; snuff-makers by the snuff which pervades the air of their places of work; pearl-button-makers suffer still more from the same cause; and the men of Sheffield who haft knives with cocoa-wood or ebony are affected with a disease exactly like the hay-asthma. The shoddy-grinders of the West Riding, who grind and break up rags in a machine called "a devil," are subjected to what they term the shoddy fever, in consequence of the devil's dust given off in the tearing process. The dressers and preparers of hair, especially of foreign hair, are speedily broken in health by the dust and stench produced by their operations.

The evil effects arising from the prosecution of these trades sink into insignificance, however, when compared with the destruction caused by the floating fluff of flax-mills. These mills employ children of tender years, who have to work in an atmosphere loaded with vegetable particles to such a degree, that in a measure it clouds the vision. The hecklers are the chief sufferers in this department of industry, especially the children, who are, many of them, forced to work the same time as adults—that is, as long as human nature can possibly hold out. We shall have more to say, however, when we come to consider the effects of bleaching and dyeing works, respecting those trades which exhaust the youthful powers of large portions of the working population, and thus do infinitely more damage to the race than the more curious diseases of smaller trades, which may be severe enough, but do not affect more than infinitesimal portions of the population.

claims for 293 weeks of sickness against the wheelwright's 64. The healthy country artisan is thus made to pay for the unhealthy town mechanic. If we take the case, again, of the miner or the Sheffield grinder, and huddle him, without inquiry, into the same Friendly Society as the agricultural labourer, it must be clear that the latter must pay for the more than average sickness of his fellows. Until the relative value of life and of sickness among the working classes is thoroughly understood and acted upon, as regards the payments of members, it is clear that the healthy trades must be sacrificed to the unhealthy ones.

It would be supposed that workers on decomposing vegetable and animal matter would suffer a sickness and mortality only inferior to the artisans subjected to the emanations of poisonous metals. *A priori*, we should say, for instance, that dustmen, nightmen, and the workers in sewers, would be amongst the most unhealthy of the working classes, and, indeed, routine sanitarians would summarily tell us that such must be the case. The begrimed and dusty scavenger, whose very name is a reproach, spends the best part of his life in clearing away the disgusting refuse of civilization; he has yet another duty to perform which brings him into still closer contact with unsavoury emanations. The lay-stall, or scavengers' yard, is of course a huge collection of the sweepings of the streets, the refuse of the markets, and the night-soil and dust of the houses, but it is not allowed to remain in a fermenting and indiscriminate mass. Almost as soon as it is deposited, men, women, and boys are employed to sift and sort the heap; bones, glass, woollen and linen rags, old iron and other metals, have to be eliminated from the mass and set aside, and the coals and great cinders are extracted from the useless ashes by the "hill-men." It would scarcely be possible to bring human life into closer contact with filth of every kind than we find it to be in the workers in these lay-stalls. Yet, strange to say, Dr. Guy, who has investigated their sanitary condition, finds them to be among the healthiest of our working population. "They are, with a very few exceptions," he tells us, "a healthy-looking, ruddy-complexioned race;" that is, they wear their natural rouge under their artificial tint, reversing the more fashionable method of May Fair.

"One or two boys," he tells us, "whom I saw at work, would have been excellent models for the artist." Our London readers will perhaps remember to have seen troops of robust and rosy-looking young women, not perhaps in afternoon toilet, making their way, about five o'clock, from the Marble Arch across Hyde Park; these are the "hill-women," chiefly Irish, trooping home to the rookeries of Westminster; their appearance quite confirms Dr. Guy's views as to the healthful

appearance of these workers. The master scavengers, who live with all their families amid these heaps of dusty desolation, excite the admiration of this searcher after truth still more; and at last, breaking out of the calm unimpassioned manner which the philosophical statist, who deals only with general truths, is wont to impose upon himself, he thus fairly gives vent to his admiration for the genus dustman :—

"To conclude this account of the health of this very useful class of men, I will merely add that the score or so of master scavengers who were brought together on more than one occasion by the trial already alluded to (an indictment for nuisance against a lay-stall keeper), as the origin of these inquiries, *are the healthiest set of men I have ever seen.* I do not think, whether in town or country, such a body of men could be brought together, except by selection; and it is not going too far to assert of them, that if the comparison were limited to the inhabitants of London, or our large towns, no score of selected tradesmen could be found to match the same number of scavengers brought casually together."

This is high praise, and doubtless deserved; but few people, however, would have suspected that Hygeia clasped so closely to her bosom the grimy scavenger in his filthy frock. Dr. Guy, however, gives us hard figures for his pleasant flourishes. If we compare the scavenger with other workmen placed under somewhat similar circumstances, he rises triumphant over them. Thus whilst the bricklayer's labourer, generally a very poor Irishman, it is true, suffers from fever, a ratio of 35½ per cent., and the brickmaker 21 per cent., the scavenger experiences only 8 per cent. of illness from the same cause. This result does seem astonishing when we remember that sanitarians sometimes attribute so much illness to the presence of a neglected dust-heap; but as Dr. Guy very justly remarks, those emanations which may prove injurious when confined within a small space—and our houses, like bell glasses, cover and keep in numberless impurities—become innoxious when fully exposed to the air. We suspect, however, that the power of ashes to absorb noxious emanations of all kinds, is at the bottom of the striking immunity which the scavenger exhibits from all febrile complaints. Nightmen and sewer-men, again, are brought into direct communication with the most disgusting, and as the public are led to suppose, the most poisonous animal effluvia; they stir in the very nidus of fever, yet it has been

remarked by many observers that they are singularly exempt from this disease. Sir Anthony Carlisle tells us that out of fifty men employed in the sewers in his time, only three had had fever. Thakrah declares that out of eighteen examined by his assistant, only two had even slight disorders, and they informed him that appetite was increased by the effluvia; and finally Dr. Guy tells us that out of thirty-four nightmen examined by him, only one had had an attack of fever, and he only through being out of work for three weeks; he suffered, in short, *from change of air*, and perhaps want of food. Dr. Guy, in the little pamphlet we have already quoted from, states a most remarkable fact, illustrative of the changes of opinion, even amongst medical men, relative to the effects of snuffing sewer emanations. He says, that a gentleman who accompanied him in one of his inspections over a scavenger's yard, informed him that, "he perfectly well recollects thirty years ago, when he was a lad, seeing as many as twelve patients directed by the faculty of that day *to walk round the shoots* for the night-soil on his father's premises; and he appealed for confirmation of this statement to his brother, who said that he had seen scores of patients industriously inhaling this curious dose of physic." Thakrah, who wrote his celebrated "Treatise on the Effects of Trades and Professions on Health," about this period, tells us that the parents of consumptive youth, in his time, brought them up to the business of a butcher, in the hope of averting that formidable malady. In endeavouring to avoid Scylla, they fell into Charybdis, inasmuch as it is a well-ascertained fact that butchers, although exempt from consumption and scrofula, are very prone to inflammatory diseases. They are seldom ill, but when ill, it goes hard with them,—so much so, that, as a class, these jolly, red-faced men, the very pictures of their own beef, are but short-lived. The effects of animal emanations, and the contact of animal substances with the skin in protecting workmen from consumption, is a very remarkable circumstance. Tanners constantly at work among tan-pits, are rarely, we believe, attacked with phthisis; and those artisans in the woollen-manufacture

termed cloth-piecers, whose skins are smeared with oil in the course of the day, present a remarkable contrast to the workers in cotton factories,—their flesh being plump and rosy, and their mucles strong. Mr. Thompson of Perth, who has investigated this subject, found the weight of one hundred young persons, so employed, increased in three months 575 lbs., giving an average increase of 5¾ lbs., and in eight selected cases the gain during the same brief period averaged no less than 17 lbs. each person. The beneficial effect of this department of the woollen-manufacture is so well known, that in Yorkshire the better classes frequently send the delicate members of their families to the woollen-mills for the benefit of their health. The application of oil, especially of cod-liver oil, to the skin, has indeed been recommended to consumptive patients, as thereby a greater amount of carbonaceous material can be thrown into the system without deranging it than by any other. After having drawn attention to so many occupations which are positively injurious to artisans, it is at least gratifying to be able to point to one large and rapidly-increasing manufacture which is so clearly beneficial in its operations upon human health.

There is a class of artisans which suffers from the inhalation of poisonous matters into the lungs, like the grinders and the masons, &c., but the foreign matter here presents itself in the form of a subtle vapour, rather than in that of dust. We little think, when we strike a lucifer-match,—that incomparable product of civilization, whose inventor deserves a statue in every capital in Europe,—what suffering it may possibly have caused in its manufacture. The composition at the end of a match is composed of phosphorus combined with oxymuriate of potash and glue, made into a paste, and kept liquid by being placed over a heated metal plate. Into this composition the "dipper" dips the bundle of matches, and in doing so he is forced to inhale the vapour given off, which is strongly charged with phosphoric acid, the effect of which upon him is sometimes most disastrous. After a time he experiences most excruciating pains in the bones of the jaw, but principally

in the lower one; they begin to swell, a purulent discharge takes place, and, finally, the bone dies and comes away. Mr. Stanley, one of the surgeons of St. Bartholomew's Hospital, had a patient who thus lost the whole of the lower jaw. There appears to be considerable doubt whether the poison acts locally or constitutionally. One would naturally suppose that if the action were local, it would first take effect upon the bones of the nose, but, as far as the experience of surgery goes, the "dipper" always preserves his nose intact. That the poisonous fumes have a certain constitutional effect, the aspect of the workman at once declares; cadaverous in complexion, emaciated to a degree, and painfully nervous, he presents the appearance of a person suffering from the presence of some irritant poison in the blood. It certainly is very remarkable that phosphorus, which, in the form of phosphate of lime, is a very important constituent of bone, should have such an extraordinary effect upon it when received into the system in the manner we have described. We are not aware that this drug, when received into the stomach only, has ever produced the local effect noticed; but, without doubt, it is the quantity of the poisonous agent to which the workman is subjected, as he not only receives the fumes directly into his mouth and air-passages in the act of "dipping," but the whole atmosphere of the factory becomes so impregnated with phosphorus, in consequence of its volatilization when the process of drying the matches is being proceeded with, that his clothes even become saturated to such an extent that in the dark they appear quite luminous. In Vienna, where enormous numbers of lucifer-matches are made, necrosis of the jaw is of common occurrence among the workmen; and the German physicians believe that the disease arises principally in persons of scrofulous habit, the periosteum or lining membrane of whose bones are peculiarly liable to take on inflammatory action, the death of the bone following as a matter of course. If this view of the case be true, all scrofulous persons should be warned from the employment, as dangerous, and in all cases employers should adopt every precaution in their power to prevent the recurrence of

such mischief to the employed. Mr. Stanley says that the oil of turpentine, which is a solvent of phosphorous, when exposed in saucers, absorbs the vapour which does so much mischief, and that its employment in a large lucifer-match factory in the neighbourhood of the London Hospital was attended with the happiest success. Thus we have another example of the power of the chemist to make the good elements of his craft do battle with the evil ones in the cause of humanity.

Another and more common instance, in which the workman is sacrificed to luxury, is the case of the water-gilder. The skill of this artisan is employed in gilding metals, principally silver, by the action of fire. The metal to be gilded is coated with an amalgam of gold and mercury, and is then exposed to the fumes of a charcoal fire, which drives off the mercury, and leaves the gold adherent to the metal. During the process the fumes of the mercury are inhaled by the workman, and, indeed, deposit their metalliferous particles over the entire surface of the skin. The result is, that he speedily becomes afflicted with mercurial tremor, or, in the language of the workshop, he gets "a fit of the trembles." If he proceeds with his work the tremor rapidly increases. Dr. Watson, in describing a patient thus afflicted, says :—

"He was led into the room, walking with uncertain steps, his limbs trembling and dancing, as though he had been hung on wires. While sitting on a chair he was comparatively quiet,—you would not suppose that he ailed anything; but, as soon as he attempted to rise and to walk, his legs began to shake violently with a rapid movement. He could neither hold them steadily nor direct them with precision."

Were it not painful to contemplate, the incoherent muscular action of workmen thus afflicted would appear ludicrous. In endeavouring to put his food into his mouth he will sometimes, as in chorea, bob it against his eye or his cheek; and extreme cases have been known in which the unfortunate water-gilder thus afflicted has been forced to take his food like a quadruped. As the disease increases, the complexion becomes of a brown hue, and presently delirium, and, lastly, want of consciousness supervenes. To this complexion comes the water-gilder; and as the silverer of looking-glasses is exposed to the action of mer-

cury, both by touch and inhalation, the same effects are produced upon him. If the charming belle, as she surveys her beauty in the glass, could but for a moment see reflected this poor shattered human creature, with trembling muscles, brown visage, and blackened teeth, she would doubtless start with horror; but, as it is, the slaves of luxury and vanity drop out of life unobserved and uncared for, as the stream of travellers disappeared one by one through the bridge of Mirza. Happily, the subtle finger of electricity has in a measure emancipated the water-gilder from the horrors of his art. The voltaic battery now deposits the metal without the intervention of quicksilver, and science has eliminated another of those destructive agencies which have hitherto afflicted this class of artisans.

The silvering of mirrors and looking-glasses still remains a dangerous operation; but there can be no doubt that with properly-constructed flues the floating metal would be entirely conducted away. Indeed, it is by the chimney that much of the metal now escapes; for Thakrah tells us that he has been informed by a manufacturer that from the sweepings of the chimney on one occasion he had collected twenty pounds of good quicksilver. Another, and a very manageable expedient, sometimes resorted to by those exposed to the fumes and the oxide of mercury, is to cover the mouth with a tube-like proboscis, which hangs out of the way of the floating metal, and thus conducts pure air to the operator.

Thakrah tells us that workers in brass also suffer from the inhalation of the volatilized metal. The brass-melters of Birmingham suffer from intermittent fever, which they call the brass ague. This malady leaves them in a state of great debility. The filers of brass, on the same authority, are subject to a most peculiar affection, like Tittlebat Titmouse, their hair turning a vivid green. It is supposed that the copper in the brass-dust combines with the oil of the hair, and thus an oxide of copper is formed. Coppersmiths are, of course, similarly affected. Plumbers, whilst casting, are subject to the volatilized oxide of lead, which in time produces paralysis; and while they are soldering, many deleterious fumes arise, of a sweetish taste, and of

a highly astringent nature, which often produces violent attacks of constipation.

But poisonous metals may attack the mucous membrane in the shape of finely-divided powder used in the arts. There is an exceedingly beautiful paper, of an apple-green colour, which is often selected for the coolness and cheerfulness of its appearance. The writer was himself once deluded by the seductive appearance of a paper of this description, and had his library furnished with it. Strange to say, a violent cold seemed to seize every one, even in the midst of summer, who stopped long in this apartment, especially if they came much in contact with the walls. On questioning the paper-hanger the mystery was speedily explained. "I never hang that kind of paper," he said, "without getting a bad sore throat and a running of the eyes. All the trade knows it is good for a cold to have any dealings with it." The cheerful green of the paper is nothing less deadly than the aceto-arsenite of copper, an irritant poison of the first class. The flock part of the paper contains a large quantity of pigment in the form of dust, which is of course liable to be detached from the walls on very slight occasions. It has been erroneously supposed that the metal must be volatilized by heat ere it can be separated from the paper; but the action of detachment is mechanical, and not chemical; the poisonous dust either falls or is brushed off the wall, and becomes mixed with the ordinary dust of the room; the lifting of a book, or the displacement of a pile of papers, proves sufficient to set these particles in motion, and to bring them in contact with the mucous linings of the eyes, nose, and throat; hence the violent irritation produced, which similates so closely the effects of a bad cold in the head. Professor Taylor, the celebrated medical toxocologist, has moreover proved the presence of arsenic in the dust fallen from this kind of paper. In a letter to the *Medical Times and Gazette*, of January 1st, 1859, he says,—

"I procured from the shop of Messrs. Marratt and Short, opticians, 68, King William Street, London Bridge, a quantity of dust for the purpose of analysis. The walls of this shop are covered with an unglazed arsenical paper, and, as I am informed, they have been so covered for a period of

about three years. In collecting this dust from the tops of the cases containing the instruments, great care was taken not to touch the walls. The quantity thus collected for examination amounted to about 450 grains. It was nearly black, and, under the microscope, appeared to consist of fibres of sooty particles. It was very light and flocculent. One hundred and fifty grains of the dust were examined by Reinsch's process, and enough metallic arsenic was obtained from it to coat about ten square inches of copper foil, in addition to a piece of copper gauze. From the latter deposit, by the application of heat, octahedral crystals of arsenic were readily obtained. The case had not been dusted for a period of nine months. Even the dust of instruments locked up in the cases, which were lined at the back only with the green paper, was found to be charged with this poisonous pigment. Half a grain of the dust sufficed to cover pretty thickly with metallic arsenic a square inch of copper gauze. These facts," says Professor Taylor, "lead to the inevitable inference that the air of a room, of which the walls are covered with an unglazed arsenical green paper, is liable to be charged with the fine dust of the poisonous aceto-arsenite of copper. Those who inhabit these rooms are exposed to breathe the dust. The poison may thus find its way by the pulmonary membrane into the system, or it may affect the eyes, nose, and throat by local action."

After this unimpeachable testimony to the poisonous character of the pigment in this paper, it is not difficult to understand that the workmen employed in its manufacture are particularly liable to attacks of illness which exhibit all the symptoms of acute influenza; or that the paper-hangers, in putting it up, are sometimes obliged to leave work for a time, in order to get rid of the distressing symptoms to which its manipulation gives rise.

There is in Sheffield an occupation connected with tool-making which forms, as it were, a connecting link between the diseases produced by working in steel and those which flow from working in lead: we allude to file-making. Unfortunately, the various preparations of lead enter very largely into the arts and manufactures of this country; and as its action upon the human body is very great, its pernicious influence is felt in a vast number of occupations of a diverse nature. Thus, white-lead manufacturers, sheet-lead rollers, painters, plumbers, potters, china manufacturers, colour-grinders, glaziers, enamellers of cards, lead-miners, and shot-makers, all come under the saturnine influence; even the poor lacemakers of Belgium do not escape, for the manufacturer, in order to make the fibre look white, requires them to dust it with white-lead powder, and possibly, by this means, it may find its way into the fair skin of a duchess!

It may seem strange that a worker in steel should suffer from the poison of lead, but it occurs in this manner:—The file-maker, in order to hold the file securely, and, at the same time, to protect the fine edge of the sharp chisel with which he cuts the face of the file, places it upon a bed of lead which rests upon an anvil. In cutting the larger three-square files, the workman uses as much as a pound of lead a week; this is detached from the mass by friction and the use of the chisel, in the form of a fine black powder. It is curious that the first portion of the file-cutter's anatomy that is affected is the finger that rests upon the lead; at first it feels numb, and then becomes paralyzed. If the artisan will not take warning by this fastidious touch of a digit, before long the poison grips him by the wrist, and then some fine morning he wakes and finds that he has what is termed in the trade "a dropped hand;"* that is, the extensor muscles of the wrist are paralyzed, and the hand falls helplessly forward, like the fore-paw of a kangaroo. Here the specific action of the poison has exerted itself through the skin of the part affected. The same thing is observable in painters, who are more subject to lead-paralysis than perhaps any other workers in lead. The finger which first touches the brush first suffers; and the potter, who has in the course of his trade to dip his ware in a preparation of lead and flints in order to form the glaze, is in like manner, but still more severely, afflicted. It is well ascertained, however, that the constitutional effects which show themselves in obstinate constipation and cholic, arise from the reception of the lead directly into the mouth, either in the shape of finely-divided particles, or floating in the air, or direct from the fingers to the manipulators: thus, painters will eat their food with fingers soiled with the brush. The mere exhalations of paint are sufficient to paralyze some constitutions very speedily; a single night spent in a newly-

* An ingenious Frenchman, of the name of Bernot, has just invented a file-cutting machine which will, we trust, come generally into use, and do away with the paralysis arising from the present handicraft. It is said that the workmanship of the machine is more even than the hand-work: the files cut in the morning by the artisan being superior to those cut in the afternoon, in consequence of his muscles becoming tired.

painted house is sufficient to produce cholic, especially in young children. And Dr. Watson, in his "Practice of Physic," relates a case in which a person suffered from dropped hands who had, she said, no concern with lead in any way: on cross-examining her, however, it at last came out that her sons "had in the preceding summer occupied their leisure time with making bird-cages and painting them green in the one room in which she habitually lived." The dippers, as they are termed in the potteries, are perhaps subjected to more frightful effects from lead-poisoning than any other workmen: in addition to paralysis and cholic, the subtle poison sometimes creeps into the brain, mania comes on, and they die raving mad. The grinding and packing of white lead is so destructive, that the men can work at the occupation for a few hours in the day only; the dust that is given off penetrates the clothes, and covers the skin to such an extent that these artisans, after taking a medicated bath of sulphuret of potassium in water, come out like blackamoors.

In these works rats and mice are speedily poisoned by the fine white-lead dust, which penetrates even to their holes. The artisan who handles lead in its various combinations may, however, vastly mitigate his trouble by adopting perfect cleanliness. Before every meal he should wash his hands thoroughly, and after work he should change his clothes. Medical science has given him the means of being forewarned that lead is entering his system by a particular and rarely-failing diagnostic sign: where the metal has entered the system a blue line will be discovered near the edge of the gums; when this blue Peter is hoisted he may know that danger is at hand, and that, unless he is more careful, his bread-earning hand will speedily drop powerless by his side. In all cases, however, prevention is better than cure; and we are glad to learn that almost perfect exemption from painter's cholic and paralysis has been secured in some extensive painting establishments, by causing artisans to drink a lemonade made by adding a drop of sulphuric acid to a gallon of water. The sulphuric acid is supposed to form, with the lead received into the mouth and stomach, a sulphuret of

that metal, which is insoluble, and, therefore, cannot be taken up by the absorbents into the system.

There are many important classes of workers whose sufferings have nothing either curious or dramatic about them, who nevertheless furnish the largest contingent to the army of death. At the head of these dismal companies march tailors, bakers, and milliners of large cities and towns. These three classes supply more victims to what has been erroneously termed "the English death," or consumption, than any other. Yet there can be no doubt that there is but one condition wanting to render these employments comparatively speaking healthy, and that one want is pure air. Dr. Arnot makes the monkeys in the Zoological Garden teach us a lesson in this particular which should not be lost upon us. In his evidence before the Health Commission he says:—

"A new house was built to receive the monkeys, and no expense was spared which, in the opinion of those intrusted with the management, could ensure to those natives of a warm climate all attainable comfort and safety. Unhappily, however, it was believed that the object would be best secured by making the new room nearly what an English gentleman's drawing-room is. For warming it, two ordinary drawing-room grates were put in as close to the floor as possible, and with low chimney openings, that the heated air in the room should not escape by the chimneys, while the windows and other openings in the walls above were made as close as possible. Some additional warm air was admitted through the openings in the floor, from hot-water pipes placed beneath it. For ventilation in cold weather, openings were made in the skirting of the room below the floor, with the erroneous idea that the carbonic acid produced in the respiration of these animals, because heavier than the other air in the room, would separate from this and escape below. When all this was done, about sixty healthy monkeys, many of which had already borne several winters in England, were put into the room. A month afterwards more than fifty of them were dead, and the few remaining ones were dying. This room, only open below, was as truly an extinguisher to the living monkeys as an inverted coffee cup held over and around the flame of a candle is an extinguisher of the candle. Not only the warmth of the fires and the warm air that was allowed to enter by the openings in the floor, but the hot breath and all the impure exhalations from the bodies of the monkeys ascended, first to the upper part of the room to be completely incorporated with the atmosphere there, and by no possibility could escape except as a part of that impure atmosphere, gradually passing away by the chimneys and openings in the skirting. Therefore, from the time the monkeys went into the room until they died, they could not have had a single breath of fresh air."

The *post-mortem* examination proved that these monkeys all died of consumption; so that we have a practical proof that

this dread disease can be brought on at will. Now, what took place in the monkey-house is taking place, in a milder form, in the hundreds of workshops in which tailors and milliners work in this metropolis. In the great majority of cases tailors work together in rooms by no means proportioned to the number that occupies them. In many cases they work knee to knee on the shop-board with the thermometer ranging from 95 to 100 degrees, no ventilation whatever being present, for when it is provided, the enfeebled workers, fearing catarrhal complaints, stop them up. The result is, an amount of consumption among them second only to that prevalent among the grinders of Sheffield and bakers. The cross-legged fashion in which he works in some measure assimilates him to the collier. It has been suggested that instead of thus doubling himself up for the whole time of his working life, he should work on a board having a hole in it of the circumference of his body, with a seat fixed for his support beneath. Such a contrivance would render his position easy, and enable him to bring his work pretty close to his eyes without his having to bend over it as he does at present. As the tailor is principally employed on black and dark clothes, his eyes are much strained, especially if he works by gas-light: hence he is subject to great impairment of vision.

The baker is subjected to a still greater number of debilitating influences as regards his health than the tailor. In all cases his place of work is in a confined basement, where the oven and the gas contrive to keep the temperature at a tropical point. There is generally a privy close at hand, and the drains are not always in good order; the air, already foul enough, has yet to be contaminated with the floating flour-dust so irritating to the fine air-passages of the lungs. In an atmosphere thus deliberately poisoned with the elements of sickness, the journeyman baker is confined ordinarily from seven o'clock at night until four the following morning, and towards the end of the week he is engaged nearly two entire days in succession. Is it surprising that their rate of sickness is dreadful—greater than even that of the tailors? Dr. Guy tells us that no less than thirty-one in the hundred spit blood, and that every other journeyman

of the low-priced bakers, who work under still worse conditions, is subjected to this most dangerous disease. We feel convinced that the public cannot be aware that they eat their daily bread at the expense of the life-blood of the producers. Parliament has refused to interfere in their behalf, but Lord Shaftesbury has taken up their cause, and we believe that ere long the force of public opinion will lead to the abolition of the nightwork, which is at the bottom of the evil. At all events, those who wish to assist in the emancipation of these slaves of civilization, will see with pleasure the introduction of the aërated bread, which by the aid of machinery manufactures the loaf in a much more cleanly method than by hand-labour, and performs the whole process in less than an hour. The introduction of machinery into this trade will at once cure the evils complained of, which result in the majority of cases from the confined establishments and insufficient means of the master-bakers.

The milliners, especially of London, are nearly as unhealthy as the tailors. The evidence given before the Select Committee of the House of Lords in 1855, to inquire into the expediency of passing a bill for the protection of needlewomen, certainly is appalling in the tale it tells of the waste of youthful life. During the season of four months, the shortest time these poor young creatures work is from six in the morning until twelve at night, and when they are very hard pressed for time they are obliged to take their meals standing. At times of great pressure young girls have been worked four days and nights consecutively; and Lord Ashley publicly made mention at the meeting at Exeter Hall, July 11th, 1856, of a witness who had worked without going to bed from four o'clock on Thursday afternoon until half-past ten on Sunday night. Such toil as this in close rooms reeking with human exhalations, and further deteriorated by the excessive use of gas, is scarcely to be matched in deadliness by any occupation engaged in even by the stronger sex; and we are not surprised to hear that it is a frequent thing in fashionable millinery establishments to find the workers faint from sheer exhaustion; as the Queen's physician emphatically says, "a mode of life more completely calculated to destroy human health could

scarcely be contrived." Mr. White Cooper, the Queen's oculist, states, in his lately-published work on the eyes, that he has generally observed a great increase of patients of this class come to him after there has been a general mourning. The committee of the Society of Arts which some few years since made a report on the industrial pathology of trades which affect the eyes, recommend that the light should be thrown on the work rather than the eye; they also recommend that the colour of the material upon which needlewomen are engaged should be changed as often as possible, upon the ground that to preserve the tone of the organ it should have variety of stimulus, its long application to the same colour inevitably exhausting it. The following suggestion from a traveller, which is embodied in this interesting report, is worthy of notice:—"Needlewomen, embroiderers, and lacemakers should work in rooms hung with green blinds and curtains to the windows. When in North China, I became convinced of the very great advantage with which this rule has been adopted by the exquisite embroiderers of that part. Their books of patterns are frequently called 'Books of the Lady of the Green Window.'" Among the diseases affecting female workers we must not omit to mention an affection called "housemaid's knee," which is peculiar to those servants who kneel much upon hard wet stones or boards. The pressure on the knee gives rise to a very painful inflammation of the bursa, or pad, which nature has interposed between the skin and the patella, or knee-cap.

Shoemakers live a sedentary life, like tailors and milliners, but they do not work so frequently in company, consequently they escape the destructive influence of foul air; they are subject, like weavers, however, to disease of the stomach, owing to the constant pressure made upon it, in their case, by the last. Some old cobblers are found to have a depression at the pit of the stomach of the shape of the heel of the boot, moulded in fact by the pressure of this article, which he clasps between this portion of his body and his knees whilst sewing. Like the milliners and tailors, their sight suffers through having to direct so fine an object as a needle point: patent bootmakers are

particularly liable to suffer in their eyes through the brilliant blackness of the material they work upon. We perceive that sewing-machines have been introduced into this trade at Northampton, much to the disgust of those whom they will benefit. The introduction of this useful machine will at once elevate this and scores of other handicrafts, such as those of tailors, milliners, glovers, and all who use the needle, to the dignity of manufacturers requiring considerable capital, the presence of which is some guarantee for the intelligence and benevolence of the masters, and for the adoption of larger and more healthful workshops for their people. As this very large class of workers numbers upwards of half a million in Great Britain, we hail the sewing-machine as an emancipator from drudgery of no ordinary kind.

The compositor, who works in an atmosphere very similar to that breathed by the tailor and milliner, is, like them, subject to severe pulmonary diseases. In some newspaper offices they are planted as thickly as their type-cases can stand, and they carry on their monotonous labour, which is confined to a multitude of small motions of the right hand, conveying to the left types in course of "setting up," Jobbing printers, who have a much greater variety of motion, are invariably healthier than newspaper compositors; and Dr. Guy has remarked that those compositors who work in the upper stories of large establishments, and consequently in an atmosphere reeking with the impurities which have ascended from the crowded rooms below, and possibly from an engine-room in addition, are much more troubled with spitting of blood and consumption than those working beneath them. In a printing office thus foully ventilated, he was enabled to make a very instructive comparison; for instance, there were fifteen men employed on the second floor, and seventeen men in precisely the same way on the third and uppermost floor. On making personal inquiries of each of the men respecting his health, four only out of the fifteen on the second floor made any complaint; one was subject to indigestion, a second to cough, the third to ulcers of the legs, and the fourth was

what might be termed a valetudinarian. But of the seventeen employed on the uppermost floor, three had had spitting of blood, two were subject to affections of the lungs, and five to constant and severe colds. Ten of these seventeen, therefore, were subject to diseases affecting the chest, while only one of the fifteen in the room beneath had a disease of this nature. In the course of his inquiries respecting the health of workers in printing-offices, the same intelligent statist hit upon another fact with respect to pressmen, which appears to be of general application. Pressmen, or those who take the impressions of the types set up by the compositors, are generally located in the same building with them, and often in the same room, under precisely similar conditions as regards ventilation and quality of air; yet a series of inquiries brings out the fact that the pressmen are far the healthier of the two. The only manner of accounting for this difference lies in the nature of their labour. The pressman has to use long-sustained and somewhat violent exertions in swinging round the lever of his press, unfolding and refolding the tympan, and screwing up its bed. Compared to these varied muscular movements, the compositor's hardest work is lifting types from his case to his composing-stick; yet the result is, that the pressman's liability to consumption is but half that of the compositor, and of other diseases a third less.

This is a very remarkable fact, and irresistibly points to the conclusion that foul air and a heated atmosphere can be borne with far greater impunity by those who labour hard than by those who employ themselves in a sedentary manner. The fair lady who honours us with her attention will perhaps draw a conclusion of her own from this experience, which, no doubt, tallies with her practice and her instinct, that it is far better to waltz till five o'clock in the morning in a crowded ball-room than to remain for the same period a disconsolate "wall-flower." There appears also to be another law, with respect to the two classes of workmen, equally worthy of remark. The pressman, although he enjoys the best health, and the greatest green age, does not, in individual cases, live as long as the compositor. In the same manner, the stalwart blacksmith, although a far

healthier man than the tailor, and generally longer-lived, does not yet count so many patriarchs among his ranks as snip does. This comparison holds good between those who take much or little exercise out of doors. Mr. Neison, who has carefully worked the fact out, in his volume on Vital Statistics, gives the following highly interesting table :—

Age.	EXPECTATION OF LIFE IN			
	In-door occupation, with		Out-door occupation, with	
	Little Exercise.	Great Exercise.	Little Exercise.	Great Exercise.
20	41·8822	42·0133	37·8017	43·4166
30	35·1170	34·5022	30·1435	36·5832
40	27·9113	27·8004	23·0357	29·1284
50	20·5022	21·1805	17·2754	21·9732
60	14·0430	15·1413	11·0169	15·5635
70	8·6490	10·4407	4·5607	9·3313

Thus, between twenty and thirty, the gardener, the labourer, the thatcher, the drover, and the whole class of men who earn their bread toilfully in wind, rain, and sun, have the expectation of living at least six years longer than the coachman, the watchman, and others who are equally exposed to the weather, but whose blood is not equally circulated or sweetened by continual and active exertion. It will be remarked also, that the out-door worker with little exercise comes off but badly in the comparison with the sedentary in-door worker—in other words, the coachman's is a worse life than the shopman's. We suspect, however, with Mr. Neison, that intemperance must thus kick the beam against sedentary out-door employments. We all know, for instance, that Jehu is not a teetotaller, and our suspicions are, moreover, strengthened by the fact that engine-drivers, who are forced to maintain a strict sobriety, although among the class of sedentary out-door workers and exposed to a hurricane of air, and to driving wet during the greater part of their existence—are yet remarkably free

from consumption—the fell disease which decimates the poor printer, who cannot tolerate the minutest draft in his place of work.

As we ascend in the social scale, it would naturally be supposed that we should find the value of life greater, and occupations more healthy. It is a great question, however, if the artisan, subject as he is to so many injurious circumstances, has not the advantage over the shopkeeper. This may appear at first impossible, but when we come to consider the life led by the tradesman, and especially by the smaller ones, who form so large a proportion of the class, we find they are subjected to an accumulation of adverse influences. In the generality of cases the individual of this genus confines himself to the smallest possible amount of room, in which he can possibly carry on his business—the rest of the house he lets off for offices. In this confined space he lives, without taking any adequate exercise, often lying perdu in a dark inner room, through a peep-hole of which he watches for customers. At night, he inhales an atmosphere polluted by many gas-lights, and when, finally, the shutters are closed, he will often be found sorting and placing away the goods disturbed during the day. Under such circumstances, is it wonderful that he perishes at a more rapid rate than the artisan who labours all day at some noxious trade, and sleeps at night in some wretched lodging? It is well-known that there is scarcely such a thing to be found as a London tradesman of the third generation. The class is entirely kept up by the rosy-faced youths who come up from the country full of hope and health, and then gradually subside into the pallid tradesman of middle life, taking on, as it were, the sad colour and aspect of the great city, just as hares and foxes turn white in northern latitudes, when winter brings about her snow.

There are certain classes of tradesmen who suffer from singular skin diseases consequent upon handling articles of their trade. Thus the miller, whose hands are constantly immersed in his meal, is subject to an irruptive disease of those members, in consequence of the attacks of the meal-mite—a

small insect to be found in some kinds of flour. The grocer's itch, again, is occasioned by handling sugar infected with an animalcule peculiar to it. We have seen sugar which absolutely moved throughout its entire mass in consequence of the immense number of insects present in it, and these readily attack the hand, and produce an irruption similar to that of the ordinary itch. Chimney-sweepers, again, suffer from a more formidable disease—cancer induced by the irritative qualities of the soot upon certain portions of the skin of the body. Neither must we omit from the ranks of unhealthy town occupations the squalid race of clerks, whose monotonous occupation and posture perpetually fixed in the form of a Z, renders them a very unhealthy class of men.

Waiters in hotels and taverns sap their health by surreptitious tippling. A medical friend says, his experience of them is, that with few exceptions, they are *all rotten with perpetual imbibition.* Footmen do not drink so much, but they are so grossly overfed and under-worked, that they are always suffering from plethora. "Jeames'" aim is to run to calves, but he pays the penalty for his ambition. They are, in fact, in the position of the convicts at Fremantle, Australia, who, during the time that our soldiers were dying for want of food in the Crimea, suffered from what was significantly called the gluttony plague. Excessive over-feeding and under-working was, it appears, the rule at the convict establishment; and, in consequence, no less than 1554 patients were under medical treatment in less than six months, with diseases of the digestive organs, inflammatory affections of the eyes, and cutaneous eruptions. The physic of short allowance and plenty of work soon set matters to rights. It is not often that the lower or middle classes suffer from overfeeding; but drink is the bane of many trades and occupations. The gigantic brewer's drayman, who seems built as a match for the Flemish team he drives, is but a giant with feet of clay; his jolly looks are a delusion and a snare. The enormous amount of beer and stout he is allowed by his employers—on the principle, we suppose, that you should not muzzle the ox that

treadeth out the corn—so deteriorates his blood, that a scratch prostrates him, and any serious illness is pretty sure to carry him off. The common labourer, who lives under pretty much the same condition, with the exception of the temptation to drink, has an average life of 47½ years, but he is cut off at the early age of 43 years.

If we take another class of persons thrown continually in the way of tippling, we find the result is equally unfavourable. The pot-boy of the metropolis, with whose doughy face and pert leer we are so well acquainted, scarcely lives out half his days. In his case, in addition to continual potations, he is perpetually breathing, until twelve o'clock at night, an atmosphere compounded of drunkards' breath, stale tobacco, and all the impurities arising from the brilliant gas illumination of a gin-palace; it is not, therefore, surprising to find that his average age is but 41½ years; while the footman may reckon upon helping himself to his master's venison until he is 44½ years old. The publican is almost as great a sinner as his man in the way of intemperance, and his life in consequence is at least 2½ years shorter than the very limited span of the tradesman.

Dr. Guy, who has taken considerable pains to ascertain the value of life in the educated classes, has worked out the extraordinary result that, the higher the step in the social hierarchy, the greater the means of self-indulgence, the less the chance of long life. People have so long been accustomed to look upon the possession of wealth as the best guarantee for a flourishing bodily condition, that they will be surprised, perhaps, to hear that in proportion as the wholesome stimulus of labour is withdrawn from any class, in the same proportion the value of its average term of life is shortened. And yet our common experience but tallies with the results of scientific inquiry in this matter. When a man who has lived a long and active life, suddenly retires with the idea that he has earned his ease, and that it is time for him to enjoy himself, ten to one but he has taken the most effectual method of shortening his life; and much as we may smile at the taste of the retired soap-

boiler, who always made a point of going down to his old shop on "boiling days," yet we can see that his instinct directed him rightly, for we can none of us bear idleness, least of all those who have long practised industry.

Regularity, sobriety, and activity of mind and body, are the pabulum on which vital force is fed; while, on the contrary, luxury, licentiousness, and sloth, are the cankers of life. A comparison of the longevity of the different educated classes proves this in a remarkable manner. Let us take, for instance, the three learned professions. If the reader were asked whether the clergyman, the lawyer, or the physician lived longest, most probably he would say the lawyer. Accustomed to venerable age on the judgment-seat, and struck with the fact that our leading law lords have generally been, and still are, noblemen of very advanced age, he would perhaps be justified in giving the palm of longevity to them. Yet, in truth, as a class, they are the shortest-lived. The race is neck and neck, it is true, but they lose by a neck. The clergyman, as we should naturally suppose, enjoys a higher standard of health, and attains a greater age, than any member of the community, excepting poor Hodge, the humblest member of his flock. His average age, taking those persons only into account who have passed their 50th year, is 74·04 years, or rather better than one year longer than the physician, who lives to an average age of 72·95 years. This trifling difference, we should expect, as the latter is subject to many chances of infection, and lives more a town life than the former. If the comparison is made, however, between the highest grades of the two professions, between archbishops and bishops, and baronets who have filled the posts of physicians and surgeons to the sovereign, the latter have the advantage by four years, and in both cases the lawyer lags behind in the race with clergymen and physicians: with the latter in his ordinary rank by a few days only, and with the class of medical baronets, as compared with judges, upwards of four years, how much hard study, alternated with tawny port, has to do with the difference, we should scarcely like to say. The gentry may

be reckoned to be about as long-lived as the clergy; well-housed, well-fed, and living an agricultural life with active habits, they have few diseases, and are especially exempt from consumption. Officers of the navy have slightly the advantage of those of the army—say one year of life. From this point, where the social hierarchy takes a leap, and clothes itself in the purple and fine linen of nobility, the lamp of life begins rapidly to burn low. The aristocracy of this country are shorter-lived, by more than one year, than he who works with all the cares and anxieties of the priest, the lawyer, or the physician; and members of royal houses (calculated from the ages of members of continental as well as English royalty) descend the ladder of life so rapidly, that they have three years less of existence than the peer; and, lastly, we come to the "round and top of sovereignty itself." The potentate who stands on the highest pinnacle of human greatness, surrounded, it would seem, with every condition favourable to comfort and longevity, fenced about from casualties which constantly beset the paths of ordinary mortals—his would appear indeed a charmed life; yet the hard fact will stare us in the face, that the sands of life run far quicker with him than with any other of the educated classes. His years are on an average but 64, or 10 less than the clergy, who probably have to fight the hardest battle in the world—the fight of comparative poverty against appearances. It could be "clearly shown," says Mr. Neison, in his "Vital Statistics," "by tracing the various classes of society in which there exists sufficient means of subsistence, by beginning with the most humble, and passing on to the middle and upper classes, that a gradual deterioration in the duration of life takes place; and that just as life, with all its wealth, pomp, and magnificence, would seem to become more valuable and tempting, so are its opportunities and chances of enjoyment lessened. As far as the results of figures admit of judging, this condition would seem to flow directly from the luxurious and pampered style of living among the wealthier classes, whose artificial habits interfere with the nature and degree of those physical exercises which, in a simpler

class of society, are accompanied with long life." Truly, there is a spirit of compensation in this life, if we could only "distil it forth." The poor countryman of thirty years of age, who takes his frugal repast under a hedge, has a chance of thirteen years' longer life than the monarch of the same age clothed in purple, and lord, perhaps, of half the habitable world!

THE END.

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